

SAM'L MILLER.

FORTY-FOURTH ANNUAL REPORT

OF THE

STATE HORTICULTURAL SOCIETY OF MISSOURI

ORGANIZED 1859
INCORPORATED 1893

MEETINGS AT
NEW HAVEN, JUNE 4, 5 AND 6,
ST. JOSEPH, DECEMBER 3, 4 AND 5, 1901.

L. A GOODMAN, SECRETARY
KANSAS CITY (WESTPORT), MISSOURI



JEFFERSON CITY, MO.:
TRIBUNE PRINTING COMPANY, STATE PRINTERS AND BINDERS,
1902.

N785
v. 44
1900

MISSOURI STATE HORTICULTURAL SOCIETY.

To His Excellency, A. M. DOCKERY, Governor:

This report of our Society work, of the meetings held, of the moneys expended and of the local societies and counties reporting for the year 1901, is respectfully submitted.

L. A. GOODMAN, Secretary,
Kansas City (Westport), Mo.

City of Jefferson, November 12, 1900.

To the Commissioners of Public Printing:

I require for the use of my office Five Thousand copies of Missouri State Horticultural Society Report for 1901—Three Thousand to be bound in cloth and Two Thousand to be bound in paper—which I desire as per accompanying sample.

Respectfully,

L. A. GOODMAN, Secretary,
Kansas City (Westport), Mo.

Approved:

SAM B. COOK, Secretary of State.

ALBERT O. ALLEN, State Auditor.

R. P. WILLIAMS, State Treasurer.

IN MEMORIAM.

SAMUEL MILLER, 2ND VICE PRES.,

BORN LANCASTER, PA., OCT. 4, 1820.

DIED BLUFFTON, MO., OCT. 24, 1901.—AGE 81 YEARS.

A. NELSON, TREAS.,

BORN ONEIDA CO., N. Y., SEPT. 8, 1830.

DIED LEBANON, MO., NOV. 10, 1901.—AGE 71 YEARS.



A. NELSON.

OFFICERS FOR THE YEAR 1902.

Governor A. M. DOCKERY.....	Ex-Officio Member of Executive Committee
D. A. ROBNETT, President.....	Columbia
G. T. TIPPIN, Vice-President.....	Nichols
C. H. BUTCHER, Second Vice-President.....	Warrensburg
L. A. GOODMAN, Secretary.....	Kansas City (Westport)
W. G. GANO, Treasurer.....	Parkville
C. W. MURTFELDT, Third Vice-President for Life.....	Kirkwood

LIST OF HONORARY LIFE MEMBERS.

R. H. JESSE, President State University.....	Columbia
HON. A. A. LESUEUR.....	Kansas City
J. C. EVANS.....	Harlem
MISS M. E. MURTFELDT.....	Kirkwood
GEORGE HUSSEMAN.....	Napa, Cal.
C. W. MURTFELDT.....	Kirkwood
HON. N. J. COLMAN.....	St. Louis
PROF. M. G. KERN.....	St. Louis
PROF. B. T. BUSH.....	Independence
PROF. B. T. GALLOWAY.....	Washington, D. C.
CONRAD HARTZELL.....	St. Joseph
PROF. H. E. VAN DEMAN.....	Parksley, Va.
PROF. J. T. STINSON.....	Mountain Grove
FRANK HOLSINGER.....	Rosedale, Kansas
WM. H. BARNES.....	Topeka, Kansas

LIST OF LIFE MEMBERS.

WM. MUR.....	Fox Creek
J. C. EVANS.....	Harlem
L. A. GOODMAN.....	Kansas City (Westport)
D. M. DUNLAP.....	Fulton
D. A. ROBNETT.....	Columbia
CHAS. RUEB.....	Seneca
C. H. EVANS.....	St. Louis
W. R. WILKINSON.....	Altenburg
H. M. WHITNER.....	Fredericktown
RIGHT REVEREND J. J. HOLAN.....	Kansas City
H. C. IRISH.....	St. Louis

STANDING COMMITTEES.

Orchards.

M. BUTTERFIELD, Farmington. W. T. FLOURNOY, Marionville. J. E. MAY, Wilson.

Vineyards.

M. OLIVER COLE, Springfield. J. F. WILCOX, St. Joseph. RALPH BUSH, Bushberg.

Small Fruits.

G. W. HOPKINS, Springfield. HENRY SCHNELL, Glasgow.
H. W. JENKINS, Boonville.

Stone Fruits.

W. A. GARDNER, Olden. J. H. KARNES, St. Joseph. E. L. MASON, Trenton.

Vegetables.

B. A. BARNES, Trenton. J. P. SINNOCK, Moberly. J. K. SAUNDERS, Peiree City.

Flowers.

Mrs. G. E. DUGAN, Sedalia. W. L. HOWARD, Columbia.

Ornamentals.

PROF. H. C. IRISH, St. Louis. R. E. BAILEY, Fulton. H. S. WAYMAN, Alford.

Entomology.

MISS M. E. MURTFELDT, Kirkwood. PROF. J. M. STEDMAN, Columbia.

Botany.

B. F. BUSH, Independence. GEO. R. RAUPP, Monett. T. B. CHANDLER, Farmington.

Nomenclature.

J. C. EVANS, Harlem. W. G. GANO, Parkville. J. T. STINSON, Mt. Grove.

New Fruits.

C. H. DUTCHER, Warrensburg. K. B. WILKERSON, Mexico.
R. J. BAGBY, New Haven.

Ornithology.

O. WHIDMAN, Old Orchard. A. H. GILKESON, Warrensburg.
C. W. MURTFELDT, Kirkwood.

Injurious Fungi.

PROF. J. C. WHITTEN, Columbia. DR. HERMAN VON SCHRENK, St. Louis.

Packing and Marketing Fruits.

F. H. SPEAKMAN, Neosho. T. R. PEYTON, Mexico. D. McNALLIE, Sarcoxie.

Transportation.

G. T. TIPTIN, Nichols. C. C. BELL, Boonville. A. T. NELSON, Lebanon.

Horticultural Education.

Chairman, G. B. LAMM, Sedalia. L. A. GOODMAN, Westport.
PROF. J. C. WHITTEN, Columbia.

MRS. G. E. DUGAN, Sedalia. MISS M. E. MURTFELDT, Kirkwood.
PROF. WM. TRELEASE, St. Louis. PROF. J. R. KIRK, Kirksville.

MISSOURI STATE HORTICULTURAL SOCIETY.

Organized January 5, 1859, at Jefferson City.

Incorporated 1893, at Jefferson City.

INCORPORATION AND REORGANIZATION OF THE HORTICULTURAL SOCIETY BY AN ACT OF THE GENERAL ASSEMBLY IN 1893.

The following law was passed by the Legislature incorporating the State Horticultural Society. The Executive Committee met soon after the passage of this act and accepted its provisions, and at the semi-annual meeting of the Society at Columbia, June 6, 7, 8, 1893, the act was adopted as part of the constitution of the Society.

MEMBERSHIP.

Under the new constitution the law requires the payment of \$1 per year for membership fee. Life membership, \$10.

L. A. GOODMAN, Secretary.

ACT OF THE GENERAL ASSEMBLY.

The Missouri Horticultural Society is hereby instituted and created a body corporate, to be named and styled as above, and shall have perpetual succession, power to sue and be sued, complain and defend in all courts, and to make and use a common seal and alter the same at pleasure.

The Missouri Horticultural Society shall be composed of such persons as take an interest in the advancement of Horticulture in this State, who shall apply for membership and pay into the Society treasury the sum of one dollar per year, or ten dollars for a life membership, the basis for organization to be the Missouri Horticultural Society, as now known and existing, and whose expenses have been borne and annual reports paid for by appropriations from the State treasury. The business of the Society, so far as it relates to transactions with the State, shall be conducted by an Executive Board, to be composed of the President, Vice-President, Second Vice-President, Secretary and Treasurer, who shall be elected by ballot at an annual meeting of the Society. The Governor of the State shall be ex-officio a member of the Board—all other business of the Society to be conducted as its by-laws may direct. All appropriations made by the State for the aid of the Society shall be expended by means of requisitions to be made by order of the Board on the State Auditor, signed by the President and Secretary and attested with the seal; and the treasurer shall annually publish a detailed statement of the expenditures of the Board, covering all moneys received by it. The Public Printer shall annually, under the direction of the Board, print such number of the reports of the proceedings of the Board, Society and auxiliary societies as may, in the judgment of the State Printing Commission, be justified by the appropriation made for that purpose by the General Assembly, such annual report not to contain more than 400 pages. The Secretary of the Society shall receive a salary of eight hundred dollars per annum as full compensation for his services; all other officers shall serve without compensation, except that they may receive their actual expenses in attending meetings of the Board.

CONSTITUTION.

Article I. This association shall be known as the Missouri State Horticultural Society: Its objects shall be the promotion of horticulture in all its branches.

Art. II. Any person may become a member of this Society upon the payment of one dollar and membership shall continue upon the payment of one dollar annually: Provided, however, that no person shall be allowed to vote on a question of a change of the constitution or the election of officers of this Society until after he has been a member for a period of one year preceding the time of election, except in case of a life member.

The payment of ten dollars at any one time shall constitute a person a life member and honorary members may be elected at any regular meeting of the Society; and any lady may become a member by giving her name to the Secretary.

Art. III. The officers of this Society shall consist of President, Vice-President, Second Vice-President, Secretary and Treasurer, who shall be elected by ballot at each regular annual meeting, and whose term of office shall be for one year, beginning on the first day of June, following their election. The President, Vice-President and Treasurer shall be eligible to but one successive re-election.

Art. IV. The elective officers of this Society shall constitute an Executive Committee, at any meeting of which a majority of the members shall have power to transact business. The other duties of the officers shall be such as usually pertain to the same officers in similar organizations.

Art. V. The regular meetings of this society shall be held annually on the first Tuesday in December and June, except when otherwise ordered by the Executive Committee. Special meetings of the Society may be called by the Executive Committee, and meetings of the committee by the President and Secretary.

Art. VI. As soon after each regular annual meeting as possible, the President shall appoint the following standing committees, and they shall be required to give a report in writing, under their respective heads, at the annual and semi-annual meetings of the Society, of what transpires during the year of interest to the Society: Orchards, Vineyards, Stone Fruits, Small Fruits, Vegetables, Flowers, Ornamentals, Entomology, Ornithology, Botany, Nomenclature, New Fruits, Injurious Fungi, Packing and Marketing Fruit and Transportation.

Art. VII. The treasurer shall give a bond in twice the sum he is expected to handle, executed in trust to the President of this Society (forfeiture to be made to the Society), with two or more sureties, qualifying before a notary public, of their qualifications as bondsmen, as is provided by the statute concerning securities.

Art. VIII. This constitution may be amended by a two-thirds vote of the members present at any regular meeting.

MODEL CONSTITUTION.

Article I. This association shall be known as ——— Horticultural Society.

Art. II. All persons interested in the subject of Horticulture may become members of this Society by signing the Constitution and paying annually to the treasurer the sum of one dollar: And provided further, that any person paying at one time the sum of ten dollars to the treasurer, may become a life member, and thereafter exempt from annual dues: Provided, further, that all ladies may become members by signing the Constitution without the payment of one dollar.

Art. III. Section 1. The officers of this Society shall consist of a president, vice-president, secretary, treasurer and executive commit-

tee, consisting of five, of which the president and vice-president shall be ex-officio members.

Sec. 2. The president shall exercise a general superintendence of the affairs of the Society; preside at all meetings of the Society; appoint all committees unless otherwise provided; draw all orders on the treasurer as directed by the Society; call special meetings of the Society or executive committee when deemed necessary; he shall be ex-officio president of the executive committee.

Sec. 3. The vice-president shall assist the president, and in his absence perform his duties, and be ex-officio a member of the executive committee.

Sec. 4. The treasurer shall receive all moneys belonging to the Society; shall keep a just and true account of the same, from what source received, and pay out the same upon the order of the president, countersigned by the secretary. At the meeting of the Society on the ——— Saturday in December in each year (or oftener, if required by the executive committee), he shall make a full and complete report of all receipts and disbursements, and at the expiration of his term of office, turn over all books, papers, and all money or other property belonging to the Society, to successor in office. The treasurer, before entering on the discharge of the duties of his office, shall enter into a bond with sufficient security, to be approved by the president of the Society for its use, in the sum of ———, conditioned for the faithful performance of the duties required of him in this section.

Sec. 5. The secretary shall keep a full and complete minute of each meeting of the Society, and the proceedings of the executive committee. He shall receive and safely keep all books, periodicals, stationery, seeds, fruits and other like property of the Society subject to its order; shall correspond as may be necessary with all persons or societies as the welfare of the Society may demand. He shall report all the proceedings of the executive committee to the Society at its first meeting thereafter. He shall countersign all orders drawn upon the treasurer by the president under the direction of the Society, and have the care and custody of the seal of the Society.

Sec. 6. The executive committee shall assist and advise the officers in the discharge of their duties; prepare all premium lists; make all necessary arrangements for holding and conducting any and all such fairs as the Society may determine to hold, and such exhibitions of fruit as the Society may determine to make, and exercise a general supervision over the same, and generally to provide for the arrangements and business of the Society.

Art. IV. The officers of this Society shall be elected by ballot

from among its members for the term of one year. The annual election shall be held at the regular meeting of the Society on the ——— Saturday in December, where the general business of the Society shall be transacted. Vacancies may be filled at any regular meeting of the Society.

Art. V. The regular meeting of this Society shall be held on the ——— Saturday of each month, at 1 o'clock p. m., at such places as the Society may select, at ———: Provided, that the meetings in the months of May, June, July, August, September and October of each year may, by a vote of the Society, be held at the residence of any of the members outside of the city.

Art. VI. Executive committee may provide: First, for the payment of premiums to members of the Society for the best display of fruit, flowers or vegetables made at any regular meeting of the Society; second, for essays on any subject of interest to the Society, and arrangement of programme for the year; and third, for determining the places for each meeting of the Society for the months of May to October, inclusive.

Art. VII. Five members of the Society shall constitute a quorum at any meeting, and three members of the executive committee shall be authorized to transact business at any meeting of the committee duly called. Special meetings of the Society or executive committee may be held by order of the president or any three of the committee on one week's notice to all members of the Society or board (as the case may be), given personally, or through the postoffice. Adjourned meetings may be held from time to time, as the Society may determine.

Art. VIII. The funds of this Society shall not be apportioned to any purpose without a vote of a majority of the members present at any regular meeting of the Society.

Art. IX. This Society shall have the following standing committees, which shall be appointed by the president at the January meeting in each year: Small fruits, stone fruits, orchards, vineyards, vegetables, flowers, ornamentals, entomology, botany, to each of which shall be referred all matters relating to those particular subjects. Each of said committees shall consist of one to three members.

Art. X. This Constitution may be amended by a two-thirds vote of all the members of the Society at any regular meeting: Provided, that notice of the intended amendment shall have been given at least one month prior to any action taken thereon.

Art. XI. The meetings of this Society shall be governed by the parliamentary rules usual for deliberative bodies.

LIST OF COUNTY SOCIETIES.

Adair County Horticultural Society—
R. M. Brasher, president, Kirksville.
A. Patterson, secretary, Kirksville.

Audrain County Horticultural Society—
M. B. Guthrie, president, Mexico.
K. B. Wilkerson, vice-president, Mexico.
R. A. Ramsey, secretary, Mexico.
W. G. Hutton, ass't secretary, Mexico.
Wm. Eagan, ass't secretary, Mexico.
W. M. Pearson, treasurer, Mexico.

Barry County Horticultural Society—
W. W. Witt, president, Exeter.
E. B. Utter, vice-president, Butterfield.
G. G. James, secretary, Hailey.
J. C. Crane, treasurer, Exeter.

Barton County Horticultural Society—
B. D. Hayes, secretary, Lamar.

Billings Horticultural Association—
John Ansler, president, Billings.
Freeman Conrad, vice-pres., Billings.
Fred Debrunner, secretary, Billings.
R. A. Hall, treasurer, Billings.

Birch Tree Fruit Growers' Association,
Shannon County—
Jas. Kirkendal, president, Birch Tree.
F. Anderson, secretary, Birch Tree.

Bismarck Fruit Growers' Association, St.
Francois County—
C. J. Tullock, president, Bismarck.
M. H. Dowling, secretary, Bismarck.

Boone County Horticultural Society—
D. A. Robnett, president, Columbia.
Sam'l Baker, vice-president, Columbia.
Jos. Baumgartner, secretary, Columbia.
G. W. Burroughs, treasurer, Columbia.

Buchanan County Horticultural Society—
L. C. Wilson, president, St. Joseph.
J. F. Wilcox, vice-president, St. Joseph.
J. M. Irvine, secretary, St. Joseph.
R. Onstot, treasurer, St. Joseph.

Butler County Horticultural Society—
D. C. Kitteridge, pres. Poplar Bluff.
E. R. Lentz, secretary, Poplar Bluff.

Butterfield Local, Barry County—
I. R. Crane, secretary, Butterfield.

Benton County (Ark.) Horticultural So-
ciety—
C. J. Eld, president, Bentonville.
I. Henthorn, vice-pres. Bentonville.
I. B. Lawton, secretary, Bentonville.
L. H. McGill, treasurer, Bentonville.

Callaway County Horticultural Society—
D. M. Dunlap, president, Fulton.
R. E. Bailey, secretary, Fulton.

Camden County Horticultural Society—
J. W. Burhans, president, Stoutland.
Henry Evans, vice-pres., Stoutland.
J. Burhans, secretary, Stoutland.
P. C. Kennedy, treasurer, Stoutland.

Central Missouri Horticultural Association—
Hermann Schmidt, president, Boonville.
D. Edwards, first vice-pres., Boonville.
C. C. Bell, secretary, Boonville.
W. A. Smiley, treasurer, Boonville.

Clay County Horticultural Society—
F. M. Williams, president, Gashland.
Oliver Chedister, secretary, Linden.

Berry Growers' Association—
J. I. Sparks, president, Gashland.

Cole County Horticultural Society—
J. B. Brooks, president, Jefferson City.
T. M. Barker, vice-pres. Centertown.
A. J. Davis, secretary, Jefferson City.
F. W. Brown, treasurer, Jefferson City.

Conway Horticultural Society, Lacke-
de County—
W. H. Getty, president, Conway.
R. O. Hardy, secretary, Conway.

Exeter Horticultural Association, Barry
County—
W. W. Witt, president, Exeter.
Jesse Talbert, vice-president, Exeter.
John Erwin, secretary, Exeter.
K. Armstrong, treasurer, Exeter.

Gentry County Horticultural Society—
W. A. Garrett, president, Albany.
G. E. Adams, secretary, Darlington.
Wm. David, treasurer, Albany.

Greene County Horticultural Society—
Theo. H. King, president, Springfield.
G. A. Atwood, vice-pres. Springfield.
Miss E. J. Park, secretary, Springfield.
H. H. Park, treasurer, Springfield.

Henry County Horticultural Society—
M. L. Bonham, president, Clinton.
M. G. Conden, vice-president, Clinton.
J. M. Prezinger, secretary, Clinton.
H. T. Burris, treasurer, Clinton.

Holt County Horticultural Society—
N. F. Murray, president, Oregon.
J. N. Menifee, vice-president, Oregon.
Wm. Kaucher, sec. and treas., Oregon.

Jasper County Horticultural Society—
F. A. Hubbard, president, Carthage.
Z. T. Russell, secretary, Carthage.

Koshkonong Horticultural Society—
County—
T. M. Culver, president, Koshkonong.
C. M. Alderson, secretary, Koshkonong.
H. C. Huxley, treasurer, Thayer.

Laclede County Horticultural Society—
Phil Donnelly, president, Lebanon.
W. R. McIlvane, vice-pres., Lebanon.
B. H. Cowgill, secretary, Lebanon.
M. W. Serl, treasurer, Lebanon.

Lafayette County Horticultural Society—
B. Turlenkie, president, Alma.
W. P. Keith, vice-president, Mayview.
G. H. Robius, secretary, Mayview.

LIST OF COUNTY SOCIETIES—Continued.

Logan Fruit Growers' Association—
 Prof. A. Stark, president, Logan.
 G. N. Boyd, vice-president, Logan.
 B. Logan, secretary, Logan.
 N. Beckner, treasurer, Logan.

Lincoln County Horticultural Society—
 A. H. Kercheval, president, Elsherry.
 T. O. Mayes, vice-president, New Hope.
 B. C. Benedict, secretary, Moscow Mills.
 C. F. Wallace, treasurer, Brussels.

Linn County Horticultural Society—
 A. P. Swan, president, Marcelline.
 I. D. Porter, vice-president, Marcelline.
 H. Long, secretary, Marcelline.
 J. W. Porter, treasurer, Marcelline.

Livingston County Horticultural Society—
 G. A. Smith, president, Chillicothe.
 T. P. Towner, vice-pres. Chillicothe.
 J. T. Jackson, secretary, Chillicothe.
 J. W. Bird, treasurer, Chillicothe.

Madison County Horticultural Society—
 A. A. Blumer, president, Fredericktown.
 H. M. Whitner, sec'y, Fredericktown.

Maramee Horticultural Association, Crawford County—
 E. R. Boen, president, Steelville.
 Peter Lovengood, vice-pres., Steelville.
 Jos. F. Marsh, secretary, Steelville.
 Chas. Lay, treasurer, Steelville.

Mercer County Horticultural Society—
 Martin Read, president, Princeton.
 J. F. Stanley, vice-president, Princeton.
 H. S. Wayman, secretary, Alvord.
 John Gearhart, treasurer, Princeton.

Miller County Horticultural Society—
 John Vetter, president, Eldon.
 E. M. Lumpkin, v.-pres. Spring Garden.
 N. J. Shepherd, secretary, Eldon.
 J. R. Helfrich, treasurer, Eldon.

Missouri-Arkansas Horticultural Society—
 D. S. Helvern, pres. Mammoth Springs, Ark.
 P. B. P. Hynson, secretary, Mammoth Spring, Ark.

Missouri State University Agricultural Club—
 Wm. B. Hoag, president, Columbia.
 C. C. Oliver, vice-president, Columbia.
 J. M. Doughty, secretary, Columbia.
 W. L. Howard, treasurer, Columbia.

Missouri Valley Horticultural Society—
 Homer Reed, president, Kansas City.
 Edwin Taylor, vice-president, Edwardsville, Kansas.
 A. Chandler, secretary, Argentine, Kan.
 G. F. Espenlaub, treasurer, Rosedale, Kansas.

Monett Local—Barry County—
 R. D. Creed, president, Monett.
 E. O. Snyder, vice-president, Monett.
 Geo. Raupp, secretary, Monett.
 L. C. Ferguson, treasurer, Monett.

Monter Horticultural Society—
 C. F. Adams, president, Monter.
 R. Boran, treasurer, Monter.

Montgomery County Horticultural Society—
 F. K. Gutman, president, Hugo.
 C. Hausser, secretary, Hugo.

Mound City Horticultural Society—
 D. B. Browning, president, Mound City.
 J. M. Hasness, secretary, Mound City.

Neosho Fruit Growers' and Shippers' Association (Newton County)—
 R. P. Liles, president, Neosho.
 M. F. Thomas, vice-president, Neosho.
 J. H. Richardson, secretary, Neosho.
 W. H. L. Stewart, treasurer, Neosho.
 F. H. Speakman, business mgr., Neosho.

Norwood Horticultural Society—
 J. W. Hollenbeck, president, Norwood.
 W. S. Calhoun, secretary, Norwood.

Pellis County Fruit and Dairy Club—
 Ed. Brown, president, Sedalia.
 G. B. Lamm, secretary, Sedalia.
 J. H. Monsees, treasurer, Beaman.

P Phelps County Horticultural Society—
 Robert Merriwether, president, Rolla.
 Albert Newnan, secretary, Rolla.

Polk County Horticultural and Agricultural Association—
 G. W. Williams, president, Humansville.
 G. M. Briggs, secretary, Humansville.
 A. H. Schofield, treasurer, Humansville.

Polk County (Ark.) Horticultural Society—
 A. W. St. John, president, Mena, Ark.
 Frank Talbert, vice-pres. Dallas, Ark.
 F. S. Foster, secretary, Mena, Ark.
 G. S. Graham, treasurer, Dallas, Ark.

Polaski County Horticultural Society—
 G. W. Faust, president, Richland.
 H. T. Hunter, vice-president, Richland.
 A. W. Rausch, secretary, Richland.
 H. M. Smith, treasurer, Richland.

Purdy (Barry County) Horticultural Society—
 J. F. Chastain, president, Purdy.
 H. W. Marshal, vice-president, Purdy.
 C. M. Bennett, secretary, Purdy.
 M. Roller, treasurer, Purdy.

Randolph County Horticultural Society—
 B. B. Boucher, president, Cairo.
 G. N. Rathiff, vice-president, Moberly.
 J. W. Dorsey, treasurer, Moberly.
 C. W. Hallibuton, secretary, Moberly.

Ray County Horticultural Society—
 A. Maitland, president, Richmond.
 G. A. Stone, vice-president, Richmond.
 R. Williams, secretary, Richmond.

Republic Horticultural Society, Greene County—
 J. J. Jones, president, Republic.
 Dr. E. L. Beal, secretary and treasurer, Republic.

Ripley County Horticultural Society—
 J. G. Hancock, president, Doniphan.
 S. S. Hancock, secretary, Doniphan.

St. Francois Horticultural Society—
 J. B. Highley, president, Farmington.
 N. J. Counts, vice-pres., Farmington.
 Maurice Highley, sec'y, Farmington.
 J. R. Pratt, treasurer, Farmington.

LIST OF COUNTY SOCIETIES—Continued.

St. Louis County Horticultural Society—
H. Meyer, president, Bridgeton.
H. C. Irish, vice-president, St. Louis.
E. W. Terry, secretary, Pattonville.
Wm. Koenig, treasurer, Ascalon.

Saline County Horticultural Society—
W. S. Huston, president, Marshall.
Thos. Adams, secretary, Marshall.

Sarcoxie Gandy Fruit Growers' Association—
J. M. Davidson, president, Sarcoxie.
John Wilson, sec'y and treas., Sarcoxie.

Sarcoxie Horticultural Association—
J. C. Reynolds, president, Sarcoxie.
John Johnson, vice-president, Sarcoxie.
J. B. Wild, secretary, Sarcoxie.
H. E. Boyd, treasurer, Sarcoxie.
J. W. Haggard, manager, Sarcoxie.

Seligman Local—Barry County—
G. W. Roler, president, Seligman.
H. M. Foster, secretary, Seligman.

Seymour Horticultural Society, Webster County—
T. C. Love, president, Seymour.
C. Childress, vice-president, Seymour.
L. S. Witmer, rec. secretary, Seymour.
F. A. Williams, cor. secretary, Seymour.
T. J. Smith, treasurer, Seymour.

Shannon County Horticultural Society—
Robt. Boram, president, Monteer.
S. W. Foster, vice-president, Monteer.
Jos. Holt, secretary, Monteer.
Wm. Wood, treasurer, Monteer.

South Missouri Fruit Growers' Association, Howell County—
Geo. Comley, president, Willow Springs.
J. Lovewell, secretary, Willow Springs

South Missouri Horticultural Association, Howell County—
D. J. Nichols, president, West Plains.
J. W. Hitt, vice-president, West Plains.

Peirce City Fruit Growers Association—
W. F. Breadlinger, president, Peirce City.
W. J. Erwin, vice-president, Peirce City.
R. F. George, secretary, Peirce City.
W. A. Rhea, treasurer, Peirce City.

Union Horticultural Society—
E. S. Link, president, Jefferson City.
D. A. Robnett, vice-president, Columbia.
A. J. Davis, secretary, Jefferson City.

Vernon County Fruit Growers' Association—
S. V. Mitchem, president, Nevada.
F. C. Huston, vice-president, Nevada.
W. H. Litson, Jr., secretary, Nevada.
I. N. Shipley, treasurer, Nevada.

Washburn Local—Barry County—
H. J. Wood, president, Washburn.
J. D. Berryhill, vice-pres., Washburn.
J. G. Marcum, secretary, Washburn.
J. J. Hickman, treasurer, Washburn.

Wayne County Horticultural Society—
J. A. Bailey, president, Wappapello.
Chris. Richman, vice-pres., Lowndes.
John Ware, secretary, Wappapello.
Jacob Fry, treasurer, Wappapello.

Willow Springs Horticultural Society—
E. C. Gleason, president, Willow Springs.
C. H. Cushman, vice-president, W. Spgs.
J. D. Pope, secretary, Willow Springs.
J. H. Allen, treasurer, Willow Springs.

Wright County Horticultural Society.
R. R. Titus, president, Mt. Grove.
G. S. Killam, vice-president, Mt. Grove.
L. M. Reese, secretary, Mt. Grove.
E. W. Brooker, treasurer, Mt. Grove.

SUMMER MEETING

AT NEW HAVEN JUNE 5, 6, 7, 1901.

SUMMER MEETING.

The semi-annual meeting of the Society was held in New Haven, Franklin County, June fourth, fifth and sixth.

The picturesque town is charmingly situated on the hills overlooking a broad stretch of the Missouri river. The kind people extended their hospitality to many delegates and visitors. A winding road or long flights of stairs against the rocky bluff led from the homes to the pleasant hall especially prepared for these sessions.

All the evening programs were delightfully varied with instrumental music, with songs and recitations.

TUESDAY, 8 P. M.

Opening prayer by Rev. J. A. Collins.

WELCOME ADDRESS.

(By M. Daugherty.)

Mr. Chairman, Ladies and Gentlemen, Members of the Horticultural Society of Missouri, Fellow-townsmen, all, Greeting:

I want to say, in beginning, that there is an apology due here somewhere. But, from who and to whom, I cannot say. I am, what you might call, an accident on this program and the why and wherefore of it, I would not attempt to say. I suppose when our mayor was elected, he was elected on a business platform. * * I suppose that is enough of an apology, except in regard to personality. I will ask you all not to look for the eloquence of Champ Clark or Mark Twain and I will not disappoint you. But hear me for about six minutes while I tell you that we are glad to see you. * * * From the time of creation and the time that our forefathers were driven out of the garden of Eden we heard those awful words, "From dust thou art and to dust shalt thou return." Man's wants are all to be supplied and this has started the industries and works of this world and he has gone on and on until today he stands

an unreasonable monstrosity. Some one of these strict evolutionists will take exception to this, but I will prove it. I don't believe that there is a man or woman in the sound of my voice who is the original idea of his God. That may be a little far-fetched. Man has gone about and seen the needs and wants of man and has set about to supply them. As I said before, this has given rise to industry and there is none grander than the one that we have represented here in our midst to-day, or to-night, I should say. The one that is represented by these men's honest faces before me. Men who have been held aloof from the world and its cares and given themselves to the study of growing plants, they have communed in silence with their God and Nature's God. When we look into your eyes we feel that we are looking in the eyes of men. Brothers, yours is a splendid work: a grand and a beautiful work. Think, if you may, of a world where all is desert—no cooling shade, no protection from the summer's burning sun or the winter's driving blasts. What a scenery this would be. What a monotony. Beauty is the poetry of vision. It is to the sight what the harmony of sound is to the ear. It is in such a work that we say welcome to you. Yes, we welcome you. We at once extend to you our hands, and let me tell you, our hearts are in them. But, this welcome of mine is but empty words. How easy it is for me to say "You are welcome." How easy I might stand here and pour out words of welcome by the hour and yet your stay here might not be pleasant. You might not feel welcome. But, I know my people. I know for whom I am speaking. I know that they will not let me lie. No, we surrendered to you the keys and throw open the gates of our little city and say to you, "come in."

But, in this work of welcome, you have a part to do. You must throw all formality and ceremony to the winds. We all know Sam Smith and John Jones to be good Missouri men. But the Ph. D. and the M.C. and so on makes us feel as if we had to reach up to touch the hem of your garments. Put your every-day names on your cards. If you want your stay to be pleasant, you must be one of us as well as one among us. Brothers of the Horticultural Society, we may not be able to show you any scenes "along the Hudson," but we will say that if you rise early some of these mornings before the peep of day and watch Phoebus as he climbs the horizon, you will see a sunrise that you cannot see every day in this world. Listen to the prattle of the children as they play their games, kick the can or hear their merry laughter in their sports, you cannot but be touched. We may not feed you in courses. We may not have the fine wines of the East; you may have to sit down to a plain meal of milk, corn bread, potatoes and bacon, but if you do, be assured that it was prepared by some kind mother, wife or daughter

of New Haven and that it was all seasoned with the good will of them. The best that we have, give we unto you.

Now, then, let us realize as townsmen that these brothers are here with us for a few days at our invitation; therefore, it is our duty to see that their stay is a pleasant one. Let us throw open our homes, our places of business, our streets and all that we have and leave no stone unturned to make them comfortable. Let us show by our very countenances when we meet them that we are glad to see them. * * *

I may talk at random, but I am acting my heart's desire. May this meeting be a successful one; may it do us all good. May your talks be loud and to the point. May they be heard from Maine to California. May it cause all to become interested in this great work so that some day we may make the wilderness blossom as the rose, until our good State of Missouri become sweet scented with nature's purest blossoms. May no discord come to mar the harmony of this meeting. May you not grow discouraged in your work; look not to left nor to the right; turn not backward; but press onward and upward until you reach the goal. May your discussions be to the point and may they be of such warmth and enthusiasm that every moth and injurious insect may be stopped in its work of destruction and bestride the Kansas grasshopper and flee away to unknown regions. May the blessings of our Creator be upon you and our people.

RESPONSE TO WELCOME ADDRESS.

(By President Murray.)

Ladies and Gentlemen:

On behalf of the Horticultural Society of Missouri, we desire to return to you our thanks for the warm words of welcome you have offered through the eloquent gentleman who has just preceded me. We certainly have every reason to believe that we are welcome in your beautiful city. Of course we expected this. We always expect to be welcome wherever we go, but have been welcomed even more than we expected.

This is the first time we have ever met in your little city. We adopted the missionary plan of going from place to place and thus we go all over the State. We have been struggling for years—for more than 40 years—to overcome the fruit-growers' enemy. In some cases we know we have failed; yet we can point with pride to several gold medals taken on Missouri fruit at the expositions. The facts of the case are that Missouri has never taken second place. I think Kansas and Nebraska

have claimed that honor perhaps, but very likely the apples came from Missouri. As I have already said, we have not overcome all fruit enemies, and in some states many feel greatly discouraged. We have discouraged ones in this State, some who would like to give up in despair; there is the extreme cold, and the drouth, and our crops are not what they should be. Yet we are not going to give up. We are like the Arctic explorers who meet with one defeat after another; yet like them we are only defeated to try again. We are pushing forward trying harder than ever to reach the goal. Now, of course, it would be nice if we could always have good crops. But we must not expect that. We are told that we must eat our bread in the sweat of our brow and we will find that we must struggle to make a living and we can find failure anywhere. The farmer. The farmer is a business man and must meet with failures like any other man. Now, last year, we had a partial failure of the apple crop; this year we have a drouth nearly all over the State, but we need not give up. I once knew of a drouth in California that lasted a 1,000 days; they did not give up. No rain for almost 3 years. Of course they depend on irrigation there. But when it does not rain for so long the water supply gets low.

Now I want to call your attention to a few plain facts. We sometimes get discouraged over our fruit crops here in Missouri. In Colorado and California—now we think that the great fruit region. Why, they don't have anything to do there. But I did not find it so. I will tell you what I did find. At Grand Junction, Colo., 75 cars of peaches were shipped from one point. I asked them if they were grown right around there and they said "O, no." I looked around and couldn't see any place where they were growing. They then told me that they grew away up on the mountains some 30 and some 40 miles from there. Now, these had to be picked and hauled through the country with wagons to the shipping point and yet they said it was profitable. But I would not like that business out there myself. They don't have a crop every year. Then they have to carry their fruit wrapped in paper all this long distance, some 150 to 250 miles in some cases. Think of the work, then the freight and the likely price at the other end of the line and yet they think it is profitable. Now, out in the fruit parts of California. The orange is the main crop. They often have 5,000 cars or more to ship. They have their enemies and yet they have converted the deserts into the most beautiful groves of orange and lemon that you will ever see anywhere. I saw a most beautiful tract of 1,000 acres of lemons. Then they have the prunes there. But one thing, my friends, you don't see the neglected orchard there like you do here in Missouri and Arkansas and Texas. No, sir; they believe in good cultivation. Every foot of or-

chard nice and clean, in good cultivation and you see nothing but fruit in their orchards. They are not afraid to go down in their pockets and take out a little money. The president of their association told me that they had 1,000 members who paid a membership fee of \$1 per month—\$12,000 a year. Now, think of this. Think of our fees here, and they wont hardly pay for the annual reports and the two meetings a year. Now we can see what those people are doing. We can find a lesson there if we will. Better things are found than growing peaches there and shipping them to Missouri. They have not got the market there that we have here. Why, I am informed by Mr. Bagby that they have shipped 10 to 15 and 20 car loads of peach trees to California. But I want to tell you something. They will take those trees and in a few years will ship the fruit back here to Missouri and it will cost you twice as much as our own peaches. Now, is it possible for those people out there to raise so much better fruit than we can that it will pay to have our trees shipped out there and then have the fruit shipped back here? These people do that and say they make money out of it. Now, why can't we raise our own fruit here? Can't we grow it ourselves? It looks to me like we are a little behind the times. Haven't we the soil here? Of course we have. * * * We have fine land for them. We have the Ozarks for peach orchards. Of course we can grow our own peaches. Then there are cherries and many other fruits. We can grow these here ourselves. We, as a Society, have been trying to get the people to take hold of this fruit raising in a business-like manner. Now then, there is one thing, ladies and gentlemen, that I have missed. I am going to say this with all due respect to the farmer. The farmer's sons can learn all about farming at their homes, but 99 out of every 100 know but little about fruit growing. Why? Because their father knows but very little about it. In most cases the orchard has but very little attention paid to it because it is only a secondary matter on the farm. Now then their sons ought to take a course in Horticulture and learn all they can about it; then the farmer would not have to depend on the fruit dealer for his fruit. Let us get our young people interested; have them study the orchard and get them to take hold of the work. We do not have the difficulties here that they have in many other places. No irrigation here; about 38 inches of rain fall every year. When we have drouths let us cultivate thoroughly and the chances are that the fruit will come out allright. * * * They have been discouraged and yet they made more money this year than last year and it will no doubt be so with the apples and peaches.

Now, my dear friends, I hope you will attend these meetings. Come in and let us exchange ideas. We want to learn to take the very best care

of our gardens and fruit farms and orchards. Let us not be discouraged. Let us bring our State to the front and not have it always so. We will not always have black jacks and scrub oaks. So they can't tell the story that our friend Nelson tells. He said he was riding along the road one day and saw a man pointing a gun in a tree and he being a hunter had respect and stopped his horse so that he might not scare the game. He watched the fellow awhile as he would point the gun around in one place and then another and finally asked him why he didn't shoot. "Shoot? shoot? Why, who is shooting around here?" He came to find out the man had a little runt of a pig tied on a long stick and was holding him up to eat the acorns off the tree. But we don't do that way any more. We could feed them on apples and corn now. So we want to befriend the fruit grower.

We are a progressive people. One thing the reason we don't raise better fruit is because we don't have to. We don't have to depend on one thing here. We live just as we please. We don't have to depend on just one thing. But to those who intend to make a business of fruit, I would say, we need to make a study of it. One reason that we have failures, often the trees are planted on ground not suitable. There is a vast deal to be learned in order to make a success of fruit growing. Let us not be discouraged. Let us be up and doing, attaining better results each year.

ARE PLUMS WORTH GROWING?

(By Samuel Miller, Bluffton, Mo.)

When a boy 70 years ago I could eat Yellow Gages, Blue plums and Apricots from trees that grew in the house-yard, but I always found the purple Magnum Bonum wormy; it never ripening. This tree stood in the garden. I might have drawn the contrast in the situations of these trees, but then we did not know the curculio as we do now.

How well do I remember the large prune tree that stood about ten feet from the porch! At night, when there came a thunder gust, how these prunes would drop! By the flash of lightning one would be located on the ground, and I would run out and usually capture it, knowing well that if I waited until morning, some one else would get most of them. What mighty events have occurred since then—wars and rumors of war and earthquakes in divers places. Our nation, which was then only fairly started, now stands first in importance of any on the earth—the mighty Republic of the Western Hemisphere.

For more than half a century the growing of the finer plums has been, to a great extent, a succession of failures. I have traveled considerable in my time, yet have never seen more than three grand crops of this fruit. One was in Lebanon, Pa., in the yard of a man who had it paved with flag stones. His trees were loaded, so that the branches had to be propped. Every morning the yard was swept and the dropped plums were thrown into a slop bucket. He had, perhaps, 20 varieties.

Another crop was at Camp Hill, Cumberland county, Pa. There were, perhaps, 20 trees enclosed by a high wall, and within the enclosure poultry were kept. Not a blade of grass or weed was to be seen. These plum trees were the Richland, somewhat similar in character to the common damson, but twice as large and less acid. I never saw a finer crop. That was just 20 years ago. A letter of inquiry has been sent asking whether this plum orchard is still successful.

The third plum crop was in Duncannon, Perry county, Pa. A trip of 16 miles was taken to visit this. The man showed me his plum patch, in which were many of the most improved varieties, some just getting ripe. These were also propped to keep the limbs from breaking. The idea of thinning out fruit was not to be thought of.

But what is the matter with your trees? was asked the owner, as they were bruised from near the ground up to the first limbs, so that there was hardly a patch of sound bark three inches square to be seen, and the gum was hardened on the trunks in lumps. The answer was that he had heard that if the trees were well hammered that the plums would stick. He certainly carried it out. Every morning he went along with a club and gave all the trees a severe pounding. By this means he gave the curculio a poor chance.

Last season there was a splendid crop of Burbanks in my yard, where the ground is bare. I think I sent the editor of the Rural World some.

Just now, May 24, I have the Ogon, Burbank, No. 2, Hale, Gold, Abundance, Quackenboss, Deep Creek, Hawkeye and some others still sound. I gave one jarring and caught some curculios. The other treatment was dusting with Hammond's slung shot in the morning when the dew was on, and one spraying with the same in solution. Time will show how this will come out.

For years my interest in the plum was so deep that all the new ones were sought after and planted. I had perhaps 40 varieties. Eighty per cent. of them are not worth growing, even if we could get crops. Wild Goose plums were grown by the bushel, nearly all of which rotted under the trees. At one time a railroad contractor who boarded with us, and who filled himself whenever he had time, asked me why I did not ship them to market. He was told that my time was too valuable

to waste on them. Well, if I count the cost of boxing, pay the express charges and a little commission, the transaction would be even with the income, and my work would be for nothing.

The Wild Goose is of too poor quality for me. While on this Wild Goose subject, let me state that there must be two varieties, and perhaps more, as we frequently see it stated that to have them bear well, it is necessary to have two or more varieties growing near them to pollinize the blossoms. My stock was from headquarters and is genuine. Trees of it in two different places bear abundantly almost every year, yet there is no other plum tree within 100 yards of either.

When the Marianna was first introduced I was offered thousands of cuttings (it grows freely from cuttings), with the control of Missouri. My reply to the offer was, that if the originator would send me some grafts to set on bearing trees, and the fruit proved worthy, I would consider the matter. The grafts came. In a few years the fruit showed, and was so poor that my interest in it was lost. But it is a good stock on which to work better ones. Letters have come to me from different parts of the State thanking me for advising them not to plant this plum. One man was just about planting ten acres of it when the trees commanded a pretty fair price.

All the money I ever received from the sale of plums would not pay my board one month. Once a firm in Minneapolis begged me to send them plums, assuring me that they would sell well. If memory serves me right, about ten one-third bushel boxes were sent. When the returns came in, and the express charges and commission paid, I was 70 cents in their debt. This was about what the commission would be, so they were informed that my plums, boxes and work were worth more than that and they might suffer the loss. Is it any wonder that my question is, Are plums worth growing? But the question can be answered. If the better varieties are planted, and the curculio and rot can be controlled, there will be money in them. Poultry, jarring and spraying will be the remedies. Spraying with Bordeaux mixture when nearly ripe will be necessary. Last season my Red Junes were loaded and nearly ripe, when the rot set in, and in a few days the crop was spoiled. Just now an inferior Gage tree, eight inches in diameter at the base, has a fair crop for the first time; many of the plums are still unstung. From this tree there was never gathered a half peck of ripe fruit. German prune trees nearly as large never gave us any return.

THE COW AN ADJUNCT IN HORTICULTURE.

(By J. L. Erwin, Steedman, Mo.)

I have puzzled over and over again as to why Bro. Goodman suggested that I write a short paper on the cow as an adjunct in Horticulture, two subjects that have—as ordinarily understood—about as much affinity as oil and water. Mayhap he thought that a fellow who had gotten up at three o'clock in the morning for twenty-five years to milk the cows and attend to the work of the dairy—Sunday thrown in—would like a job that he could lie abed till five or six o'clock in the morning, or toast his shins by a warm stove of a blustery winter day while his trees were sleeping.

The dairyman dreads the cold march winds; the horticulturalist rejoices to see them as they hold the fruit buds back for development when there is less danger of frost.

Job was a dairyman; and a first-class optimist when he said "I washed my steps with butter—and Beaumont had not been discovered—the rocks poured me out rivers of oil." The good Lord that made us knew that most of us liked to sit in the shade, hence when he started Adam and Eve to housekeeping he taught them Horticulture. Dairying is all right for a young fellow brim full of energy and who must be kept constantly busy or he would be in mischief. I do not know but that to be the wife of a dairyman was a part of the punishment that was meted out to the daughters of Eve for gratifying her curiosity.

Then it looks, too, as if the Lord intended our closing years to be devoted to Horticulture, for in "the beyond there is a stream as clear as crystal and beside it there is a tree that bears twelve kinds of fruit and yields its fruit every month."

The Master when he was here went to a fig-tree to get something to eat instead of a dairyman who is rarely able to supply his own family with butter and milk.

"A land flowing with milk and honey" was the ideal of poetic happiness.

The dairy has many charms. The merry hum of the milkmaid, the soft "Co Boss, Co Boss" and as her big soft eyes look into your in eager expectation of a nubbin or a kindly pat of the hand you feel a thrill of joy.

When the limbs grow weary and the back stiffens with age you turn to something less severe—shorter hours—more breathing spells. The returns are not quite so regular—frosts, insects, diseases—may cut short

the crop—our expectations may not be realized. The old question of our boyhood days is still debatable. "Resolved there is more pleasure in pursuit than in possession."

Last fall I used a corn husker and shredder in putting away my corn crop. Shredded fodder is a fine feed for a cow and after she has gone over it the waste makes her the nicest and dryest bed of anything I have ever used. I hauled this direct from the stable and covered my strawberry beds. It is the nicest stuff to cover strawberry beds or anything you want to winter in the ground I ever saw. No grass or weed seed in it; then it retains the moisture well. Even in this eventful year of the twentieth century, 1901, we have had some very fine strawberries with only a sprinkle of rain since the 17th of last April. Then you all know that strawberries and peaches without cream would be like a negro outside of a watermelon patch.

The cow is the greatest producer of fertilizers (when she is not fed in the big road) that we have. How soon will it dawn on the average Horticulturalist that the trees and vines must be fed—manured. Three or four years ago a fellow went through the country selling trees and instructing the farmers how to set them. He had them to dig holes two feet or more in depth and put a foot of well rotted manure in the hole and the same soil and then plant the trees. When I see a man putting manure under the roots of a tree to make it grow I think of the boy whose duty it was to feed the calf from a bucket. The calf was slow about drinking, so he tied the bucket of milk to its tail that it might take it along and drink when it got ready. Scatter the manure over the surface away from the plant or tree a few inches or feet, as the case may be, so that the heat, air and rains may convert it into food for the plant and it will soon be found and taken up.

This spring I received from Bro. Bagby a fine lot of pear trees. I let a friend have two or three. During the time I was planting, his wife visited my family. At supper she says, "We have so much trouble in getting trees to grow, especially pear trees." "That is because you do not know how to plant them," said I. "Well, then, I wish you would show me and I will have ours planted over again." I sent for a tree. Now Bro. Bagby grows his trees on a deep soil. He gets them out with long roots that are often more than a foot long and seem to go nearly straight down. I dug a hole about six inches deep and large enough to spread the roots out nicely all around in. I then took my knife and about five inches from the crown I cut on the underside the root about half off so I could readily bend the roots out. I placed the tree in the hole, spread the roots as indicated, drew in the top soil, firmed it well with my feet and the tree is growing nicely. "But that is not according to directions," said

she. The directions say to plant the tree as deep as it was in the nursery. "Yes, but yours is a clay soil and if you put the roots of the tree down in that cold clay the tree will starve to death before it is able to draw any nutrition from the soil." Keep the roots of the trees near the surface, cover with the top soil and get them started and when a good growth of leaves is made the roots will take care of themselves.

No man will grow trees or berries long without fertilizing. The cow in the orchard is worse than a night raid of neighborhood boys in a watermelon patch; but on the outside, well cared for and well fed will turn you many a penny from the pail, butter your bread, furnish the delicious cream for your peaches and strawberries, to say nothing about furnishing fertility to keep up their growth.

THE EVERGREEN AND ITS USEFULNESS.

(By F. C. Meyers, Greenfield, Mo.)

The everygreen deserves more attention than it gets. It is too much overlooked by our fruit growers and farmers. Here in Southwest Missouri I find the evergreen very useful. A row of evergreens on the south and west side of an orchard would break the southwest wind, as a few days of such a wind in winter or early spring causes the sap to start and then a sharp cold snap weakens the vitality of the fruit buds and sometimes kills them. In the fall we have more or less of hard, dry southwest winds that blow for several days and causes lots of the finest fruit to fall off the trees, and a wind break on the south and west would prevent largely that. A hedge or row of evergreens on the west and north side of the small fruit would be a protection from the cold and bleak winds in early spring.

To the farmer the evergreens are very useful as a shelter for live stock, his orchard and to hide unsightly objects from public view.

The White pine is the best of all the pines for wind breaks. Scotch pine next. Austrian or black pine and the Tennessee are very good, as they will stand considerable weather and are good for wind break. The Douglas and Blue spruce are the most hardy as to drouth and cold. Next to the American White spruce.

Of the firs the long leaf of Colorado and the German silver stands drouth best. The Chinese Arborvitae stands drouth well, but not cold. The Siberian is very good. American Arborvitae best for wind break, and in pyramidal form a beautiful lawn tree. All the Junipers stand drouth well. The English best for low wind break.

If the Norway and Hemlock Spruce could stand the dry weather better they would be among my choice, but the dry weather has killed most of them here. The Red Cedar is one of the hardiest and best evergreens that we have, but the cedar balls or apple is ruining the tree in this section. Is there a way to destroy the cedar ball on cedar trees? These are the best out of fifty varieties that I have tried.

NOTE—The cedar ball is one stage of a fungus which causes an injurious rust on apple leaves, and the best way to prevent this is to pick off the balls before spring.

Secretary.

SECOND SESSION—Wednesday Morning, June 5th.

After the call to order prayer was offered by Mr. C. W. Murtfeldt of Kirkwood, Mo.

The topic of the session was the strawberry.

PREPARATION OF THE LAND AND THE BEDS FOR STRAWBERRIES.

(W. H. Litson, Nurseryman, Secretary Nevada Fruit Growers' Association, Nevada, Mo.)

I would commence at least one year before setting to prepare the land for planting the strawberry plants by first putting on from 25 to 50 loads of good barnyard manure per acre, according to the fertility of the land. The land should be made rich enough (before setting the plants) to produce at the rate of 75 bushels of corn per acre with a fair season. It is preferable to put the manure on in the winter, and plowing it under the following May.

Plow 6 or 8 inches deep. Follow with a subsoil plow running 6 or 8 inches deeper. After plowing harrow smoothly and sow cow peas at the rate of 1 bushel per acre broadcast. When the cow peas are about ripe plow them under, using a rolling cutter to the plow and a log chain to turn the vines down into the furrow. Then sow to rye. The following March or early in April turn the rye under, plowing and subsoiling the same depth as before. Harrow and drag with a heavy plank until the soil is thoroughly pulverized and fine and mellow.

Mark out one way with a common sled runner corn-marker, with runners as markers 2 feet apart. Draw a line across these marks, making

the rows 3 to 3 1-2 feet apart, setting the plants by the line at each crossing, giving a chance to cultivate both ways for awhile and save a great deal of hoeing. After the plants have started to make runners freely, cultivate the wide way of the rows letting the runners come together the narrow way.

PLANTING.

After the plants are taken up straighten out the roots, cut off all dead leaves and runners, dip the roots into a thin mud; then plant with a nurseryman's steel dibble; be sure and have the crown of the plants on a level with the top of the ground and the roots well firmed.

KIND OF LAND.

Any well drained land that will produce 40 to 75 bushels of corn per acre in a fair season. If I had my choice I would prefer sandy soil. For early berries select a sheltered place with a south slope. For late would select a north slope. As to the kind of land (sandy or clay) it depends upon what varieties are planted. Some varieties do best in light sandy soil, while other do best in heavy and clay soil.

GROWING STRAWBERRIES.

(By D. A. Turner, St. Joseph, Mo.)

The first thing is preparation of the soil. Break the land in the fall about 10 inches deep; then in the following spring sow to sorghum or broomcorn; then about June 25th plow under and sow to cowpeas. The whippoorwill is the best I have tried. When the pods form on them, plow them under. Again late in the fall, just before the ground freezes, plow again. By this process we get rid of the white grubs, and the land is left in good shape, free from all weed seed. I have my land in good shape in the spring by harrowing and dragging until smooth and solid. Do not plow in the spring. Take a plank drag and go over the ground both ways; be sure to go over it the way you want your rows to run the last time. In marking off rows take two wheels of even size, make an axel four feet wide, fix handles to it like a wheelbarrow, thereby marking two rows at once. Take three stakes to go by. I find them much better than a line. Take a spade and place it in the mark; press down to about 8 inches; move it backward and forward, and then remove the spade. Have plants ready by placing in baskets after they have been trimmed and dipped in water. Take the plant in the right hand, spread the roots out fan shaped, place in the mark, press the soil firmly, having the crown just even with the surface. Now I have them set; commence plowing and

hoeing, and then go over with the weeder. Go the first time the way they are plowed, then across. I find I seldom lose a plant when they are set with a spade. Plow and hoe each week, or after each rain, when the ground is dry enough to work until the last of September. I put on a heavy mulch when the ground is frozen hard enough to hold a team and wagon. I find good clean straw, no wheat or cheat left in it, the best mulch that can be put on. If there is cheat or wheat in it you must haul it out in loads and fork it over to get it thoroughly clean. If you do not you will be sorry you are in the strawberry business.

In gathering and marketing strawberries: First have good clean crates and boxes. Get women first, girls next and boys last to do the picking. Send them to the field with a superintendent. They are assigned rows and instructed to grade the berries in two grades and to pick by the stem with about a half inch of the stem on the berry. Do not pick until thoroughly ripe. Do not put anything in the box but good, sound, ripe berries of even grade. Fill boxes full and round up some; laying the berries on their sides at the top of the box; turning the stems downward as much as possible. As soon as the dew is off I commence picking, and when six or twelve boxes are picked they are taken to the shed or barn and placed in crates by someone who knows how to grade them. One picker comes up with two grades—they are put in two different crates and marked "1" and "2," and the No. "2" goes for the second grade. I am to-day, June 1st, getting \$2.00 for No. 1 and \$1.50 for No. 2; so I think it pays to grade them. They run about 1-3 No. 2 now, and we have had no rain for about four weeks or they would not run so many to No. 2. I do not allow throwing of berries, or loud talking in the field. When a picker does not pick according to orders I give him a second chance and then if he does not improve he is discharged and never taken back. That makes the others more careful. I use tickets for keeping tally—1, 10 and 25. When they have picked a crate they get a 25 ticket. I find this the most convenient way of keeping tally. It don't matter who comes with the berries, that party gets the tickets, and the one who has the tickets when pay-day comes gets the money. I pay on Mondays, finding that they will come on Sunday by doing so. (I have to pick on Sundays to supply my customers and keep the berries from getting too ripe. I find the best market on Monday morning. I sell to grocers mostly, some commission men, but never send out on commission. I go by the saying "A bird in the hand is worth two in the bush.")

I find that cherries and strawberries go fine together. I put a heavy mulch on berries and keep them back, and I find by doing so I have them come in about the same time cherries do, and bring better prices.

THE STRAWBERRY—GROWING, PREPARING AND SETTING
THE PLANTS.

(By F. H. Speakman, Neosho, Mo.)

I dealing with the subject assigned me I will attempt to speak only from the standpoint of the commercial planter. He it is who must master every detail from the setting of his plants to the marketing of their product. Competing as he must not only with those in his own section, but in others as well, in the markets that are naturally his, he must first of all be practical. Everything that will tend to improve either the quality or quantity of the output of his fields must be taken up and mastered. It is not enough that he study varieties; he must study types as well. Every grower should raise his own plants and the greatest care should be exercised in securing those true to label and of the best strain. Having secured the plants of some reliable nurseryman or fruit grower select a piece of well drained land of fair fertility and preferably of good elevation for the plant bed. Set varieties together as much as possible to prevent missing by running across from one row to another. Rows should be from 4 to 5 feet apart, with plants 3 to 4 feet apart in the rows. The distances to be determined by the plant making capacity of the variety set. Free running sorts, as Warfield, Haverland, Aroma and others should be set the greater distance with Bubach, Clyde, Greenville, Parker Earle and others similar in habit the lesser. Give thorough and deep cultivation during the season, removing all blooms as they appear, that no energy may be wasted but all concerned for the making of plants.

Deep preparation of soil with shallow cultivation after has been the rule of procedure advocated by most authorities on the strawberry, but in South Missouri the deeper the work all along the better. Narrow shovels in either the two-horse cultivator or double shovel plow give best results.

Having completed the cultivation of the plants their removal from the ground prior to the setting in the fruiting field is in order. This should be done in this region during the months of December and January for best results. Not only is time saved by doing the work at this season, but better growth and stand of plants are secured.

Take up one variety at a time, using a good strong prong hoe or "scratcher" for the purpose. Do not leave any plants for fruiting, but remove the whole row. Plants for setting should be grown in one place, and those for fruit in another. As you dig them remove to a suitable

place for cleaning them. Removes all leaves, straighten out the roots, cutting the latter back to about 3 inches in length and tie them in bunches of a convenient size. Be careful to allow no mud to remain in the crowns, but keep them as nearly dry as possible without exposing them too much to the sun or drying winds. After cleaning them in this way pack the bunches in shallow boxes (four-basket peach or tomato crates serve the purpose well), one layer deep, with tops up and store them in a good case or tight cellar where the air is somewhat damp. They can safely be kept in this place until planting time or till probably May 1st. Do not sprinkle them at any time, but simply stack them up six feet or more deep if you need to and leave them alone until needed.

Early planting is desirable and as a rule may begin about March 15th here. Prepare the land in the most thorough manner possible, not in the smoothing of the surface, but in the loosening up to a great depth. Little harrowing is necessary as the rains firm the ground sufficiently as a rule. In setting the plant a thin-bladed dibble is the best tool that can be used. While, in good ground, a trowel in the hands of a very careful man will do good work, a dibble is much to be preferred. Care should be exercised in firming the soil around the crowns and roots and in getting the plant the proper depth.

STRAWBERRIES—REPORTED VARIETIES.

(By J. E. May, Wilson, Mo.)

With no rain since the 12th of April our berries are almost an entire failure. All varieties bloomed full and set a good crop of fruit. The varieties that have withstood the drouth best and produced the best fruit are Crescent, Clyde and Haverland, Bismark, Sharpless and Parker Earl that always produced so many buttons are full of perfect berries this year, but they are very small. I think this shows they fail to fertilize properly when we have much rain. My choice of varieties for our section would be Haverland, Warfield, Bubach fertilized with Bederwood. Am trying Ridgeway and Lady Thompson, but can't say how I shall like them, as the drouth has knocked them out this time.

My report on strawberries is short on account of extreme drouth. No rain for seven weeks, and no prospect of any. Am afraid the fruit business will break me up if the orchard does not bear soon; trees making fine growth. Am giving clean, thorough cultivation. Had promise of 200 cases of strawberries and not get 5. My raspberries have come out wonderfully and with rain would give one-half or more of crop. Don't think anthracnose is spreading much on account of dry weather.

STRAWBERRY GROWING ON THE OZARKS.

(By G. L. Sessen, West Plains, Mo.)

I prefer new land, rocky hill sides to plant on. Cut down the timber in winter, pile the brush in small piles so when burned the ground will be well burned over. Break the land both ways in the winter and two more plowings in the summer. Harrow it well, sprout and burn the roots. Sow in cowpeas in July. In the fall without farther plowing mark it off each way 4 feet. Plant November 1st to January 1st; plant in the cross. I use the cotton hoe, the blade cut to 4 inches wide, handle 14 inches long, draw the earth (and rocks) to the plant and make it level. In this rocky soil the plant will not heave in the winter. It is hard to make a stand in spring planting; oftentimes the plant dries out before it is well rooted. In the spring begin plowing early both ways several times with a double shovel; then bar off both ways with a turning plow; hoe the hill with the same hoe as was used in planting. Plow again with the shovel until the plants commence running; then one way for matted row. After this culture we had beautiful Clyde and Warfield, the best two varieties grown here that stood the drouth for seven weeks; began picking May 9th and still picking today, June 4th, in our rocks.

DISCUSSION ON STRAWBERRIES.

Judge Miller of Bluffton, Mo.—I have been doing a little with strawberries and expect to do more if I live. I have an experiment I want to try. I have two slopes. One of them is a direct north slope and the other is a direct south slope. Now, I mean to plant the early ones there and the late ones on the north slope. On the south slope am going to cover the ground with leaves so deep that it cannot freeze at all and on the north side it will freeze as hard as a bone. Now, I am going to see if I can't push the season about two or three weeks.

Mr. Fowler of St. Clair, Mo.—I plant my strawberries in rows three feet one way and four the other, and sometimes four feet one way and two the other way. I find this about right.

J. J. Keiser of Stanberry, Mo.—I would like to ask a few questions for information. I can't get my strawberries to bloom together. Some of my late ones bloom sooner than the early ones. Now, I would like to have a list that would bloom together; I do not care about the ripening, but I want some that will bloom together. I would like to hear your opinion on this. •

Major Holsinger of Rosedale, Kans.—I think the papers on strawberries were up to date and contained about all that could well be said on the growing of strawberries. But they advised a great deal more care and attention than I have given my plants. I would like to see a person who does give them as much care and attention. I don't know of anybody that does and I don't know whether it is necessary either. But what we want is not about the blooming, but we want rain. We fertilize the Haverland with Bederwood. In fact the Bederwood was ripe with us before some of the others had come into bloom. The Bederwood ripens for about two weeks and others still bloom yet. We have been irrigating our beds this time. We found they were short of moisture. We use an engine to pump the water. But let me tell you it takes more than one eight-horse power engine to water about 12 acres. We use the 2-inch pipes all over the 12 acres; we have been running all last week and have gone over just about one-half. One 8-horse power engine is about right for four or five acres and not more than that.

Question: How high do you have to pump the water?

Holsinger: About six feet.

The land was very dry and the crawfish had come to the surface, making holes all over it. We got some hose and run down the rows so that we could water each plant. But this is a disadvantage because the plants get fairly scalded when the sun comes out. We then threw down the hose and let them run in the evening and morning. We let the pumps run all night. But this is very expensive.

Question: Isn't it a big job?

Holsinger: Yes, sir; it is.

Question: Not all ground would soak up water as fast as others, would it?

Holsinger: No, sir; ours is bottom land.

Mr. Waters.—I believe I have seen the question of moisture solved this year. Of course, I may be disappointed, but it is a good thing I believe. It is an experiment of a man who lives near me. His land is heavy bottom land. It is drained and the land near it is drained also. It is a very hard land, the meanest kind of land. He has another patch that is tolerably moist. But the berries on this patch are just beginning to ripen and I am sure his little crop will vastly more exceed this. In the first place the land is tiled drained. Then he puts on a mulch very heavily—about 8 inches deep. Now, that is heavier than I have ever seen any one put it on. His rows are about 4 feet apart. Leaves a good space for mulching and it is easily done. His berries stand the drouth.

Question: About how much mulch; say 40 acres?

Waters: Oh, he has only about two acres. But it is certainly a fine

thing. We have had no rain there all spring and the ground is moist enough to rub into balls.

Question: When does he put this mulch on?

Waters: In the winter. He just covers them up. Has his ground plenty rich. But I do not believe that this would do where the land is not drained, as the mulch would cause it to be too wet in the wet season. But the drain will prevent this. And one thing certain it will hold the moisture in the dry seasons.

Question: Does he put the manure on his plants?

Waters: He usually puts it on the ground before the mulch, but sometimes he puts it on a mulch.

Question: What varieties has he?

Waters: He has several, but we were talking it over the other day and he said he was going to confine himself to three varieties. The three that do the best there are the Haverland, Clyde and Warfield. The Clyde has been the most productive. The early ones will fertilize the late ones.

Jacob Faith.—I have grown strawberries for more than 30 years now. I am from Southwest Missouri, 18 miles west of Nevada. My soil is bottom and is very heavy. I have some sloping to the southeast. In my experience for 30 years I have never seen mulching so profitable as this year. Yet we may overdo a good thing. I have ruined my berries ever so many times by putting a mulch on too thick.

Question: Is this land drained—tiled drained?

Faith: No, sir; it is bottom land. It will drain itself.

Question: What varieties have you?

Faith: I cannot give up the Crescent. I like that berry. Then I have the Warfield, Bubach and Mitchels Early.

Major Holsinger.—In regard to that heavy mulching. Now, I want to say that this is about the way I have been doing. On ten acres of berries we put 40 acres of wheat straw. The mulch was about three inches after it had been gone over and beaten down. The soil is dry. I have found that often this treatment will cause the ground to be moist. My boys claim that the best berries that we ever grew were on land so wet that it was actually mud when they picked them. I do not believe that you can get too much moisture on your plants.

Question.—What varieties have you? *

Holsinger.—The Clyde, Warfield and Haverland.

Mr. Erwin.—I realize that I am only an amateur in the strawberry business, but I may have a few points of interest. I may call your attention to the preparation of the soil. R. E. Bailey of near Fulton, Mo., is one of the best strawberry growers in Central Mo. He puts his fertilizer on

the ground the year before, grows no crop there at all, does not plow it down, but begins stirring it at once. He spends the entire year in preparing the land for the growth of his plants. The soil is stiff clay soil; some limestone.

Now, about the mulching. The tendency is to bring the roots to the surface. In a dry season like this I find that when the roots are brought so near the surface the plants suffer worse than they would otherwise. We must think about the kind of land that we are using or the roots will get too near the surface.

I am not familiar enough with the varieties to give any list, but I think those varieties having plenty of leaf surface do better than those that have such thin foliage. The same is true with the apple and peach and the cornfield as well. We need a thick, heavy leaf.

Dr. Green of Chillicothe, Mo.—With me the Glenn Mary hardly needs any rain. It has a big fine leaf and stands the drouth fine. Now, I don't raise strawberries on a large scale, but I want to say a word about mulching. I find that if I put a layer of forest leaves under the mulch it does much better. Any kind of mulch on top will hold the leaves down. My soil is elm and hickory land. The soil is about 20 inches deep. I find that berries require a great deal of care. As my list I will name the Glenn Mary as the first choice, then the Warfield and Crescent.

Mr. Hamilton of St. Clair, Mo.—The best growing plant is the Sample. We also have the Haverwood and Bubach. The Clyde is the unproductive variety I have ever had. I do not think it fit to plant on my ground. It seldom, if ever, has any fruit.

Mr. Butterfield of Lees Summit.—The Clyde is the best berry I ever saw. I would name the Clyde, Ruby, Bubach, a large berry, but not very good to eat.

Mr. Wittenbach of Morrison, Mo.—I never mulch my berries. Have raised them for years and have never mulched them yet. Three years ago on 2-3 of an acre I did not mulch and made \$189. This year I will make about \$80. I plowed up one patch last year and it is doing fairly well this year. Set my plants in rows about 4 feet apart. I tend them till September. I never mulch any at all. The varieties are Capt. Jack, Downing and Bubach.

I grade my fruit as I pick. Trust pickers to grade. Get ten cents a quart.

Miss Park of Springfield, Mo.—We have only about 1-4 of an acre in strawberries this year. We are testing new varieties. Excelsior, Brandywine, Bismarck, New York and several others. Excelsior is a very early berry. Johnson's early is an early berry. Clyde is a good berry, but not fit for shipping. The drouth is beginning to fade them.

The Bismarck is the best berry that we have had this year. It is sweet and solid as can be. The only objection is that it is not highly enough colored. The Sample is a very nice berry. I have only a dozen plants of the New York. It seems to be a large berry and very solid. The Haverland is a beautiful berry. We also have the Aroma. The Excelsior, Bismarck and Parker's Early are fruiting now.

J. J. Kiser.—I live about 30 miles south of the Iowa state line. I have about one acre of strawberries on rich land. I keep them well mulched with straw. The ones that have done the best with me are the Clyde and Haverland. The Warfield does not do any good at all with me.

Mr. Evans.—We have some strawberry growers near us and they raise berries in a large scale. They use Capt. Jack, Windsor, Crescent and some Bubach. They are doing very well and we have not had a drop of rain there since the 14th day of April. Now these are the only varieties they grow there and the only ones they have grown there for years. They increase their grounds every year. They were loading cars when I left there. They get from \$1.50 to \$2 a crate for them. They are selling on the track, too. Whatever you do, sell on the track at your own home.

Member from Clay County.—I would name the Capt. Jack, Windsor and Bubach.

Judge Miller.—I won't be with you very long any more, but I do like to see my friends stand up for Capt. Jack. I am proud of it. The Capt. Jack is not dead yet and I am glad of it, for I originated that berry.

Question.—Why was it not included in your list of varieties?

Miller.—"Modesty."

Mr. Murtfeldt, Kirkwood, Mo.—We must remember that Missouri is a grand old State, but it is not all creation. We have a variety of soil. One variety of berry may be the best here and another may do the best there. So we can come to no definite conclusion.

Mr. Atwood of Springfield, Mo.—It is my pleasure to go around among the strawberry growers and I cannot help but think of Mr. Evans whenever I see them selling on the track. They are selling them on the track at Peirce City for \$1.60. At Monett they are doing the same thing. That is very encouraging. We have been working for two or three years talking about selling on the track. This year we do it. A great many people said we could not do so, but we are. Don't sell them any other way. But I don't believe I would believe in dumping them into the river if I couldn't sell them this way. No I think I would make them into pure strawberry juice before I would do that. Now, if the growers will only

hold to it, they will have no trouble in selling this way. Our growers are making about twice as much money as they did before.

It is dry in our section—one rain in about six weeks. I believe the best thing is to have your ground well prepared. Plow the ground four or five times eight or 16 inches and don't put on any mulch except a little bit of fertilizer. I used to think our land in my part of the State was not very rich, but we don't use any manure for strawberries. They grow the Warfield more than any thing else at Peirce City. At Monett they grow the Warfield and Haverland. The Aroma is taking the place of the Gandy. The Clyde is not so popular as it was a few years ago. It lacks in leaves and is not high colored enough. The Sample is the best berry. Then we have the Republic and the Bubach as a great favorite. We feel like congratulating ourselves on the strawberry question. Our yield is a little short this year. Last year we shipped out 339 cars. Sarcoxie shipped out 238 cars three years ago. Last year Fayetteville, Ark., came to the front with 66 cars. Sarcoxie about 60.

Mr. Barnes of Kansas.—I started in the berry business in '73 in Kansas. One thing I do not believe that it is necessary to fertilize. I never saw land anywhere that made the berries better by fertilizing. I do not believe in it at all. I don't believe in letting your land lie idle for a whole year. I believe in keeping something on it. Raise two or three crops a year. I have raised two crops in a season. I would prepare the ground for berries. I would put the ground in some garden crop first, then I put manure on it about knee deep. The plow it under, cover it up and put your plants in in the spring. You will never have better berries in your life. I tried this. The winter storms and snows made it just right. Now that ground was as rich as can be found anywhere. I paid \$100 an acre for it. It is creek bottom.

Last Friday I was in a horticultural meeting of a county association in Kansas. They raise lots of berries out there. All of them favored the Gandy and Clyde, the Brandywine and Tennessee Seedling. All of these are fine berries.

About planting them. I would plant them in rows about four feet apart to leave room for cultivation. Two feet is too close to cultivate handily. I would set them about eight inches to a foot in the row. I think it would pay to set our plants closer than we do in the row.

Mr. Erwin.—I don't live in land that cost \$150 per acre, but have pretty good soil. I am just beginning. I want to put out a bed for next year just as soon as it rains. I am going to plow up the bed that I have now and pick up the plants that are in it and put them in the ground that I have been working all spring so they will begin to grow right away. Next year I hope to have a fine crop of berries.

Mr. Irvine, St. Joseph, Mo.—I am one of the fellows that you are looking for. I am a consumer. So you see that I don't know very much about it. Now, you hear some say that narrow rows are just the thing. I know a man who has a patch as wide as from here to the depot and not a row in it. Then I know of one man who makes a great deal of money that has his plants set in rows four feet apart. Let's every runner set. Cultivates them, of course. In the fall he mulches them very heavy with fertilizer. Then in the spring he rakes a part of this off and leaves the rest on and lets the plants come up through. The Bubach is about the best variety with him. His berries are always about 50 cents higher than the regular market. If berries were \$2 a crate, he would get about \$2.50 for his. Because his are worth it. His berries are always in demand. He does not have to loaf around the market place to sell them. So I have come to the conclusion that there is no sure thing about strawberries. Now the other man that makes so much money has no rows at all in his bed; it is all one row. The plants are about 8 to 10 inches apart. He won't have any rows. He says that he can pull the weeds out. Next fall he will mulch after he has gathered his crop of berries. He makes just about as much money out of his berries as any one else.

The Clyde has received a black eye in our part of the country. It is not fruitful enough. It has not enough foliage to hide its nakedness. By the way, we have rain. We live in a good part of the State. The main varieties they have there are Crescent, Capt. Jack and Wathena. Hon. N. J. Colman:

Mr. Chairman, Ladies and Gentlemen—This is very unexpected indeed, I am referred to as one of the ancestors of this Society. I want to say that I feel as proud of that honor, if I ever received any honors, as of any that I ever received in my life. In 1856 or '57, I issued a call for the organization of a State Horticultural Society. We met in Jefferson City and organized and have been a society ever since that time. I had the honor of being elected President of the Society. I was a young man then, just starting out in life, but I saw great possibilities for fruit culture here. I thought it the best State for all kinds of fruit.

I always feel pleased when I can meet with friends of the Horticultural movement and when I am permitted to see such interesting meetings as this one, and when I look over so many gray heads here this morning, I feel proud that I had the opportunity of being the father of this organization. When I see you assembled as you have here, taking into consideration what varieties are best suited here and those best suited there, the cultivating, the good you can do by not only helping yourselves, but the farmers of our State, I rejoice at it.

At the time of the organization, I had a little different view of what I have now. I thought that it was so important that every farmer should produce fruit for his family, that if we had a society of this kind, that all the people would go to producing fruit for their own families. I thought it would help the farmer in a great many ways. But I have been most grievously disappointed. How few farmers have enough fruit to even gratify the appetite, the wants of the human system. How few farmers are successful in fruit raising. Some of them have a small orchard of perhaps two or three acres and have fruit a small portion of the time. But God has given us fruit for every day in the year. Strawberries come first, then gooseberries, raspberries, blackberries, currants and the grape. Then we have peaches, pears, cherries, plums, apricots, quinces, apples and so on. All these are things that every one in this State ought to enjoy, can enjoy, and in my young days I thought would enjoy. You have come here to talk over these matters with each other and you are doing a grand work. I beg of you to go on and on in this work to encourage your sons and mothers, wives and daughters to take an interest and engage in this elevating work. God has planted down deep within our hearts the love for fruits and love for flowers and has given us natures to consume fruit. My parents had this love and my grandfather and my grandmother did.

I want to say that there has been a great evolution in the strawberry business. I raised the Wilson and Albany. They were productive varieties, solid—would stand shipment from St. Louis to New York. They were fine berries. Now, how many of you today cultivate these varieties? You have passed them by? Well, I want to tell you that you have passed a good variety. The easiest money I ever made in my life was produced by these berries. Now, with the strawberry it is as everything else. We must try new things. But are we not all starting too many new varieties? I don't want to stop you from experimenting. Not at all.

When it comes to apples, peaches, pears and plums and cherries, instead of selecting a few of the best varieties, are we not planting too many varieties? Nowhere do we notice evolution as much as in apples. The good old Jeneton, Vandevere and Pryor's Red—whoever hears of these now? In my young days these were the ones that were raised for market purposes. There are several other standard varieties that I have forgotten. Now all these were good varieties. But where are they today? We are growing. But still I believe that we ought to confine ourselves to a few standard varieties for market purposes. Now I don't want to take up your time this morning. I am very thankful to be with you. I want to congratulate you on the success of this meeting

and the good work you are doing. I hope you will go on in your work and have a county association in this county, if you haven't any now. Let the good influence of fruit growing go on and on until we all shall be made wiser, happier and better. I thank you for your kind attention.

Mr. Levi Chubbuck of St. Louis, Mo.:

Friends—It is hardly necessary to call on another editor, it seems to me. Though, of course, I appreciate the fact that you did call on me. I don't know that I have anything to say on the topic under discussion this morning.

As I listened to the discussion and the remarks of experience, it struck me that it was a very necessary thing to develop so many new varieties of strawberries. Missouri is a great State in many conditions. We have nearly all kinds of soil and climate. It seems, then, that we should have a large number of varieties to select from to suit the locality of the grower. I think it is well that we have the development of varieties.

Another point. Here we watch for the development of fruit growers among the farmers. To a certain extent this is all right. But beyond that I question. I believe that he can put his land to better use. He needs to get over the idea that it is wrong for him to spend his money for fruit and then he can look to the fruit grower for his fruit. This would certainly be an advantage to the fruit grower. While the farmer could devote his land to his crops and I believe that it would be an advantage to him as well as the fruit grower. The fruit grower makes a business of it, can raise better fruit, deliver it better and in better shape than one not accustomed to it. I agree that there is a point there. The quality of fruit is to be considered. I think it is a great art to know all about the business. But it is this that the consumers in the cities do not appreciate; they were brought up on the farms. I find that it is very hard to get fresh, good fruits or vegetables on the markets. We have heard a great deal about the variety of fruit that can be shipped a long distance. But I do not think it is the best. Now, if there was a ready market among the farmers and people in the near surroundings of the fruit grower, he could afford to raise better class of fruit instead of confining himself to that which can be shipped long distances by rail. They could sell it at their own homes.

Now, I do not want to be understood to say that I do not think the farmer should raise any fruit on his place at all. No; I do not mean that. But I do believe there is a point there that the farmers and fruit growers should reciprocate.

Judge Miller of Bluffton, Mo.—As good crop of berries as I ever grew were from plants on a dry season that never made runners at all.

Plants fruited and were taken up and planted and they made a fine crop of berries, as good as I ever grew. The first runners were taken off and they made runners.

Mr. Barnes of Kansas.—I don't like to see an orchard of about 100 trees cultivated when there are about 75 of them dead. I don't like to see a strawberry patch with gaps in it when these plants can be supplied so easily. Potted plants are the finest thing I ever saw to fill up gaps. Now I hope that I may say something about these potted plants that will be valuable to some one. The pots can be bought almost anywhere. Fix up a box of soil, some good mixture; fill your pots with the soil and put your plants in them; fill the pot and then sink it. I like this method best. Fourteen boys will put up several 100 of them in one day. Sink the pots and in a few days the plant will take root, and as the soil is rich in the pot, it will soon fill it up. You will be surprised to see how many roots there is to the little plant. You will find great long roots. There will soon be runners growing out beyond it and if you want it to put out more, all right. Now, I take them up. I go through with a wheelbarrow, cut them loose and pull out the pot, put them in the wheelbarrow and take them to the side of some shed or any convenient place. Take them out and get your watering pot and then give them a good soaking. Then give them a good shade. You will find that the cutting will make them wilt. In two or three days you will be surprised to see what lively plants you have. Then you can take these plants, when the weather suits, and go through your patch and just plant them right where you need them. Put them in the places where your plants failed to grow. In this way you can fill up all gaps nicely. I certainly think it very valuable for everybody to have these pots. They are not expensive, and you can get them anywhere almost and they will pay for themselves the first year you use them.

APPOINTMENT OF COMMITTEES.

On Fruits—F. Holsinger, J. E. Thompson, D. A. Robnett.

On Finance—J. C. Evans, A. H. Gilkeson, M. Butterfield.

On Obituary—C. H. Dutcher, Dr. J. W. Greene, H. C. Irish.

On Final Resolutions—J. M. Irvine, W. A. Gardner, C. W. Murtfeldt.

THIRD SESSION—Wednesday, 2 p. m.

Topics—Raspberry, Blackberry, Dewberry and Grape.

RASPBERRY.

(By Wm. H. Strong, Seligman, Mo.)

The raspberry has been cultivated to a considerable extent in Barry county for 10 or 12 years and does well and is profitable in some years. The causes of years of partial failure is the drouth and hot sun in July and August. Raspberries will not stand too much drouth and hot weather in the last of summer. These must be overcome by cultivation at the right time of the season, and by planting corn every other row. Raspberries require good fertile soil, not too heavy or wet. If the soil is not fertile manure should be used—not fresh manure. Raspberries do well on new land, and the finest I ever saw grown were on new land. The soil should be plowed deep and marked off with a small plow 4 1-2 by 6 feet; or if you wish to shade with corn, 4 1-2 by 8 feet. Plant a row of corn in the wide way, every other row, so you can plow both ways, using a double shovel plow or a cultivator. Do not plow so deep as to cut the roots. Plant tips, as they are better in every respect than older plants. The new growth should be pinched off at the height of 2 or 2 1-2 feet. This is very important, as it causes them not to get too high, and also to branch like a tree, and raspberries grown this way do not require stakes to keep them from falling down. Some top two or three times in the season when they do not want to grow plants. If you wish to grow plants tip only once and let the branches grow down to the ground and cover the tips in September or earlier if there is rain enough to wet the soil. If the tips are covered in dry weather they will die. Plow or cultivate early in spring and at the same time cut out all dead wood and also trim all hanging down vines. After the harvest of the berries trim out all old wood and cultivate so as to keep the soil from drying out in the hot, dry weather of July and August. The Kansas is much the best variety to grow, as it is much hardier, and bears more berries than any other hardy variety. Gregg is a fine variety, but tender and kills badly and is not so early as Kansas. Hopkins is earlier than Kansas, but will not stand drouth as well, was largely grown in Barry county, but now discarded on that account.

SPRAYING RASPBERRIES.

(J. E. May, Wilson, Adair county, Mo.)

As I have been growing the raspberry for commercial purposes but a short time, my experience is somewhat limited, and I am sure Secretary Goodman could have assigned the subject given me to some one who could have written a more interesting and instructive paper than I can.

I have always grown the raspberry for home use, both red and black, and never had occasion to spray until I came to Missouri, which was in the spring of 1892. On the farm we purchased I found the Turner red and some variety of black raspberries. These produced us one or two crops of fruit and then died out, I suppose winter killed. Not wishing to be without raspberries, I purchased 100 plants each of the Cuthbert and Hopkins, and put them out, giving good culture. They made a fine growth and I expected a fine crop of berries, but when spring came I found them nearly all dead. "Winter killed again," I said, and decided they were not hardy enough for this climate. I left the plants, however, hoping for a crop next summer. The plants made a fine growth and it was with much interest that I watched the bushes the next spring, but was doomed to disappointment, for they were dead. I have never been able to pick a gallon of berries from the 200 plants.

I was taking a fruit paper at the time, and read an article in it describing a disease called anthracnose that attacked the raspberry; so I began to investigate and found that was the trouble with my bushes. Let me say that the Turner has never been affected with the disease, and is growing right by the side of the Cuthbert.

In the spring of 1897 I set out 1,000 plants of the Kansas raspberry and had great hopes of producing good crops of fine fruit, but found that the anthracnose had spread to them, though not nearly as badly, and they produced a fair crop in 1898. The new canes made a fine growth and withstood the extreme cold of the winter of '98 and '99.

But I found that the anthracnose was getting a better hold each year, and concluded something must be done, or I would soon be out of the raspberry business. So in the spring of 1900 I prepared to spray. Previous to spraying I cut out all diseased canes, which I think should be done. I sprayed the first time with copper sulphate solution before growth started; second application with Bordeaux mixture, when canes were four to six inches high; and a third application about two weeks

later. I intended to make a fourth application after the crop was gathered, but the pressure or other business prevented.

Now for results. I watched very closely and could not detect much of the disease on the canes, and thought I had about eradicated it; but this spring I found it was not to be so easily conquered.

Did I say "so easily conquered?" If you had held a knapsack sprayer strapped to your back, as I did mine, and carried it for a half day, you would probably conclude that it was not an easy job. I found a great many of the best canes badly diseased, some entirely dead, and I was thoroughly discouraged. The strange part of it to me is that the late, small canes were most of them healthy, and I have the promise of a half crop. The Cuthberts are the best this year they have ever been, and will give us more fruit.

I am spraying again this spring, but am using a barrel sprayer, and can do a better job, as it breaks the mixture into a finer mist. I notice that it is almost impossible to cover the canes, as it gathers in drops on them. I can cover the leaves all right, but that is not the part affected.

To sum the matter up, I can not see as the spraying did much good, and I am afraid I will have to give up growing the raspberry on account of anthracnose. I hope this paper may be the means of bringing on a discussion of spraying for anthracnose, and if you have been successful, let me know what preparation was used and when and how it was applied.

PRUNING THE RASPBERRY.

(By J. F. Wilcox, St. Joseph, Mo.)

In pruning the raspberry in this section of the State there are so many and varied methods practiced that the conditions should be understood to harmonize these differences. Of course the extent of pruning depends on the width of rows and distance between plants. Some set plant rows 6 feet apart, the plants 18 to 20 inches in row, cutting laterals back to 6 to 10 inches, 3 to 5 canes in a hill. Some set rows 7 feet apart with plants 15 to 24 inches apart, 5 to 6 canes in the hill; laterals cut to 12 to 18 inches. Again, some are planting rows 10 feet apart, with plants 12 to 15 inches apart. This is a new departure and time only will tell the result. My individual opinion is that 7 feet in width of rows and plants 3 to 3 1-2 feet in rows, with laterals cut back to 15 to 20 nches, and 4 to 6 stalks left in hill, is, all points considered, about the proper training for the Kansas or Gregg raspberry, as the

plants should be just close enough together to shade the ground without crowding.

The old wood is seldom removed until spring, and pruning is best done after buds start: that all dead wood may be cut away and enough live wood left to produce fruit.

Discussion.

Raspberry—Cultivating and pruning.

Mr. Hamilton of St. Clair, Mo.—My Cuthbert, Kings and Lawtons are nearly all killed. But I don't think it is anthracnose. My Kings had the anthracnose, but I sprayed very heavy. I lost about 1-2 dozen, but I think they were winter killed. In fact, I believe that the winter has done nearly all the damage to mine. I thought the Cuthbert was a hardy plant, but mine were killed by the winter. I gave the plants a thorough cultivation last year, but this year I have not done so much for them.

Mr. Evans of Harlem, Mo.—I am growing only two varieties and don't believe that I want to grow any more. I find that I can make money out of only two. The Thwack is a berry that I originated and I am satisfied it will grow. I am not making a big fuss about it, but I am making money out of it. I have 12 acres of it. The other varieties that I grow is the Evans. It is a black berry. I have no trouble with anthracnose with the Thwack and the Evans.

L. A. Goodman, Secretary.—Kansas, Ohio and Hopkins are the three best blacks that I know of. We have been troubled with anthracnose. We do want to grow the blacks unless we can do away with anthracnose. I have tried all kinds of soil. I had some planted on new land, just had the timber cut off and then had some planted on old soil and anthracnose has attacked every patch. I would certainly like to know if there is a remedy for it.

Hamilton.—I had the Lawton and thought it a good berry, but it was winter killed.

Mr. Evans.—I do not like the Lawton. I believe it is our duty to inform each other of a humbug. I haven't a Lawton on my place and won't have any longer than it takes me to find it and pull it up. I don't want any on my place. I have had forty years' experience with raspberries.

Dr. Green of Chillicothe, Mo.—I have about ten acres of raspberries in my orchard. I have been raising them this way for some time. When the trees get too large I take my plants out. But some of my best berries were grown under the trees. I find that I have less an-

thrachnose under the trees than I have anywhere else. Now, as to the Lawton. I sent to Mr. Lawton himself and got 500 plants. The stand of them is a good one and they made a fine growth last year. In the fall there came a little freeze and I had my men to lay them down and cover them up and I left them there till spring and when we uncovered them they came out fine. Not a dead stem on them. We left them a little late, but they came out all right, as nice as they were in the fall. I did not put on a very heavy mulch. I have got what promises to be a splendid crop of Lawtons. But, of course, I don't know what they will be.

I always remember what a friend of mine once said. I guess I have told this Society of it before. But it is true. He told me that I might always expect one crop sure. That was failure and disappointment. But I never failed to have it. Now, when I have the finest prospect of raspberries that I ever saw, I am looking for the usual crop of disappointment. I have always found it so. But I have had some good crops of raspberries.

Question: What was your object, Dr., in covering your raspberries?

Dr. Green.—To keep them from freezing.

Question: How did you cover them?

Dr. Green.—I had my men to take a diamond plow and plow the dirt over them after we had laid them over. It is not a big job to do. I used to be scared about covering up berries. But I will never be scared about it again. It is all right.

Mr. Butterfield of Lee's Summit, Mo.—The Lawton is certainly away from its home at Lee's Summit and Farmington. I have tried them. The Cuthbert is the same way. I think it is because it is away from home. I don't think it is the winter so much as the late growth. I have never had a good crop of Lawton. The Cuthbert is very similar.

Mr. Hamilton.—Now my berries are planted side by side in the same patch. Now, why should all the reds be killed and not the blacks?

Mr. Butterfield.—Well, mine did. The Miller red does the best with me. Have you ever planted the King?

Mr. Hamilton.—No, sir.

Butterfield.—Have you planted the Miller?

Hamilton.—Yes, sir.

Butterfield.—Probably you did not have the genuine Miller.

Mr. Jacob Faith of Montevallo, Mo.—I have tested, as well as I remember, 33 varieties of raspberries in the last 25 years. If I were confined to a few varieties, I will say that I have come down to only two varieties of the blacks. The Kansas and the Evans. Those two are the best. Both do well and are healthy. No disease on them whatever.

Mr. Waters of Canton, Mo.—Our experience with anthracnose has been very limited. I once had some and sent a sample to Secretary Goodman and he wrote back that it was anthracnose; to spray with Bordeaux mixture. I did so and that was the last of it. The last we have ever seen in our town. The disease is not what is the matter with our berries. Ours get winter killed. If we can get them through the winter, the finest berry, red, I think, is the Shaffer Colossal. It is a big berry. According to our taste, it is the finest berry out. But the winter always kills it right down. Except in 1901. Well, for two winters it has stood it all right. We have some Cuthbert, too. Both our varieties get winter killed. We are not troubled with anthracnose.

Dr. Green.—I can tell you about anthracnose next year. If Bordeaux mixture will kill it. Ours stand with the trees and they have been sprayed twice with the same dose as the trees. If the spraying will help, I guess my raspberries will be all right.

Mr. Jacob Faith.—I want to say just a few words. I think there is no greater humbug than Shaffer's Colossal. I got some 18 years ago. Of course they came with a great big name and they are a wonderful big berry. I think they are the fruit agent's berry. They might make money out of them. But they belong in a warm country. I would never take anybody's money for Shaffers. I might also say a word to my friend about taking his raspberries out of his orchard. Why not let them stay? You can save yourself that work. They are all right there. They won't hurt your apples and your apples won't hurt them.

Dr. Green.—My biggest berries were grown under my trees.

Mr. Evans.—I believe that Bordeaux mixture will kill anthracnose. Cut your affected plants off at the ground and spray the ground two or three times and then spray the plants when they come out and you will have a fine crop of berries the next year and probably from then on. I am sure you can hold it in check with the Bordeaux mixture. It can be done, no question about it. Bordeaux will kill it.

Dr. Green.—I have no signs of anthracnose on my Lawtons.

Judge Miller.—I have the Lawton. It pleased me very much last year. They stood the winter fine and I headed them back to about five feet and they are looking fine and please me. The Cuthberts were killed in the very same patch with with them. I believe I have but one cure for anthracnose and that is a good hot fire. A hot fire will surely do it.

Mr. Evans.—I want to ask the gentlemen from Notheast Missouri how do you class Shaffers Colossal? Red or black?

Answer: It is red.

Waters of Canton.—The Gregg, Kansas and Cumberland are best black. Cuthbert is red. Shaffers Colossal is raised by a neighbor of

mine for the last 15 years. He gets about as many crops from it as any other variety. When it is not winter killed, it is certainly a fine berry. It seems to me if there could be a way to keep them through the winter, we would have a good sort of berry.

Mr. Barnes.—I would like to know if any one has tried the New Cadinal. It is a red berry and has the characteristics of a black raspberry. I wonder if any one has tried them? If so, did it prove hardy?

Judge Miller.—Yes, sir; I tried them. I had only a few, but they got through the winter very well.

Mr. Irwin.—It has been tried out in Kansas. Mr. Dixon says it is a fine berry. He says he found an excellent market for them. He thinks it is a good berry. Some object to the color, but he says he likes it.

Mr. Atwood of Springfield, Mo.—One of our large growers says he prefers the Doolittle. I would like to know if any one else has had any experience with the Doolittle.

THE BLACKBERRY AND DEWBERRY.

(M. L. Bonham, Clinton.)

Although I have grown blackberries for fruit and plants for many years, my zeal has not been such as to cause me to experiment with many sorts, but have contented myself to take the experience of others and to profit by what I have learned through them. I find that for the locality in which I live (Clinton, Mo.) the Early Harvest for an early sort and the Snyder for a late kind are the best—everything being considered—although the Erie is very fine and comes near being equal to the Snyder. The Kittatinny is one of the finest fruits of any I have tried, but it is so subject to rust that it does not usually pay to plant it. The Early King is a little larger than the Early Harvest, but lacks in productiveness, has very long sharp spines and is more liable to rust, so I don't think it pays to grow it where the Early Harvest does well. The Early Harvest has such small seeds that it is often called the seedless blackberry. I have tried several other sorts with poor success, but am now trying the new white berry called Iceland, and find it very fine, for a novelty at least. I have grown it two years and so far is perfectly hardy and healthy. It seems to be of the Early Harvest type, is very productive and has not shown any signs of rust. The berry is about the size of the Snyder, of a transparent creamy white color and of a very peculiar, pleasant flavor. I am also trying the highly recom-

mended new sort, Mercereau. I have had it only one year, but think from what I can see it is quite promising and worthy of general trial.

The soil that grows some sorts of blackberries is not so good for some other sorts. I find the Early Harvest does well on high, gravelly soil, while the Snyder is almost the opposite, as it does better on rather heavy, moist soil and does not last long on dry, high, rock soil; but when we look to nature for an example we find the common wild blackberry flourishes on almost all kinds of soil and locations.

I prefer very early spring planting, as the frost sometimes "heaves" out fall-set plants, and unless they are well mulched they are liable to be injured, especially in dry cold winters, but plants, if properly protected, are best dug in the fall, as all roots that are cut callous over and new sprouts develop on the roots, which makes them grow much more easily.

I am a grower for fruit and plants of the dewberry, and find it much more profitable than the blackberry, as it does not come in competition with the wild blackberry, as do most of the cultivated blackberries. I have a new sort that I have grown for a few years and like it very much. It is called Austin's Improved and originated in Texas. It is very early, large and productive. It ripens with the raspberry and readily sells at the same price. It is nearly two weeks earlier than the Lucretia and is nearly gone when the Lucretia begins to ripen. The Lucretia is a good berry and I grow it, but find the Austin more profitable. The berry of the Austin is almost round, very large and a glossy black, and sells for a fancy price as a dessert fruit.

I plant both sorts on ridges 2 1-2 by 3 feet high and about 6 feet from center to center between the rows. I let the new growth grow as soon as it naturally comes, but I tip them several times during the summer and they almost make a bush. I keep well cultivated and mulch in the early winter with bottom prairie grass and take it off in the spring about the time the buds begin to start, then cut them back to about 2 or 3 feet, dig the tip plants and thoroughly cultivate and keep them clean either by cultivating or mulching.

BLACKBERRIES AS A MONEY CROP.

(By J. H. Marion, Fulton, Mo.)

I will say in the beginning that the first thing essential in growing a profitable crop of blackberries is the soil and the preparation of same. Any good corn land will grow good blackberries and lots of them if well prepared and given good cultivation thereafter.

I would plow land deep in late fall or early spring, harrow and drag until well pulverized, then take a one-horse diamond, lay off rows eight feet apart by turning a furrow out each way; loosen up the subsoil with a subsoiler or a long shovel plow, going two or three times in the furrow made by the diamond. After this is done, cultivate up and down the furrow with a one-horse cultivator or harrow so as to partly fill the furrow, then you are ready for the plants.

I prefer one-year old root cutting plants to any, but good sucker plants will give good results if properly set and given thorough cultivation, especially the first year.

I dig plants and heel in close at hand, taking out only a few at a time. I put a plant every three feet in the furrow made by diamond plow. I aim to plant about two or three inches below the surface, which will insure against drouth. I have a boy to hold the plants in position while I, with a hoe, fill in the soil and tramp it down. In this way I can set about one thousand plants per day.

I always plant in early spring, after which I go over the field with a fine tooth cultivator to loosen up the soil and leave a fine mulch to protect the plants in case of drouth. I cultivate after every rain until about the first of September.

I usually grow potatoes or cowpeas between the rows the first year, after that the space is unoccupied till about the 1st of August, when oats or cowpeas are sowed broadcast for a winter mulch.

I pinch back new growth when about thirty inches in height which causes them to branch out low and be, when trimmed in spring, about four feet high—a very good height for convenience in picking. I leave from two to three canes every three feet in the row. Early in spring cut back branches to about ten inches, remove old canes and burn them to kill any insects or fungus diseases that may be in them.

So far I have had but little trouble with either; have found a few cane borers which I take out and destroy at once. Have found some rust, mostly among the Erie which is a poor berry and should never be planted if you want any profit; the rust I dig out and burn. For anthracnose I am spraying with dry dust, bluestone and lime.

For profit plant the Snyder and Taylor, and if you have a good local market, a few Early Harvest. Some of my customers ask for these calling them little seedless berries. To my taste they are very poor in quality.

I market my berries in 24-quart crates, and have never sold for less than 90 cents per crate and as high as \$2.00 per crate. At those prices I realize from 75 to 100 dollars per acre. I do not count picking and marketing, as that is done without any hired help. I put none but

the very best berries on the market; the culls are used at home for jam, unfermented wine, etc. I pick every three days, so as to have nice, sweet berries. My market is only a local one. I would not attempt to grow blackberries for less than 75 cents per crate.

In conclusion I will say plant Snyder and Taylor, hunt a good market, give thorough attention to all of the details, and one will be sure to succeed.

BLACKBERRY.

Judge Miller.—I would like to know if there is any difference between the Early Harvest and Austin early? Have any of you had Early Harvest?

Mr. Faith.—I grow all my plants from cuttings only. If I send off and get a new kind and they send me plants, I make cuttings from them. I have grown the Snyder and the Taylor. I do not think the Taylor is more productive than the Snyder. Now I am growing the Early Harvest and some Snyder. The Early Harvest looks very healthy. Is bothered with but very little rust. When I go through my berries and see some rust, I put mittens on my hands and pull the plant up. Now this is done on a very damp morning, not on a sunny or windy day. We never spray them at all. I find the Early Harvest to be a very early berry and profitable to me. I think in the 18 years that we have had it, that it was only damaged by the cold twice and then we only had about one-half crop. Kittatinny only failed once. Snyder never failed.

The Wilson was a good berry, but I quit that about 15 years ago. But the best that I grow now are the Early Harvest and the Snyder. They are like the Dutchman's coon; they are up and gone before the others are started.

L. A. Goodman, Secretary.—Does any one know anything about the Austin Improved? It is two weeks earlier than the Lucretia. Now is that not a dew berry?

Judge Miller.—They are very good. I have a goop crop this year where I tried to kill them out.

Hamilton of St. Clair.—What do you do for the rust? The leaves of my plants were colored purple. If you hit the leaf, it falls off. The question I want to come at is this. Shall I spray these plants or not? What shall I do with them?

Miller.—Yes, sir; spray it. To be sure, spray it.

Hamilton.—If it does not hurt the wild berries, it will not hurt the tame ones.

Barnes of Kansas.—About the Austin. It was brought to my mind last spring. It is a blackberry that comes about two weeks earlier than the Early Harvest. But not always a good bearer. Some think it is a cross between the Kittatiny and Early Harvest. A gentleman sent me some claiming them to be very fine and that they were two weeks earlier than the Early Harvest. But I cannot say what they will do yet. He claimed 27 points for that berry. But as I said, I can't say what it will do yet.

Major Holsinger.—I have some plants growing that I believe are going to be a very fine berry and I think will be a valuable one. The varieties that do best with us now are the Early Harvest and Taylor. The life of the Snyder is about 10 or 12 years.

Dr. Green.—About the rust. I firmly believe that the rust is a root disease. I once read that it was but did not believe it and so I experimented, I pulled the diseased ones up, sprayed all thoroughly with Bordeaux mixture and the others I kept cut off clean. Now I found this spring that those vines came out rusty. Now I think I know it to be a root disease and not a stem disease. The Early Harvest is the only one, except the Taylor that I ever made any money out of. The Taylor is a good berry to bear. My Early Harvest came through the winter splendidly, without any being killed and at the same time, my Snyder was killed down to the ground.

Mr. Evans.—The blackberry to take the place of the Snyder has not yet been originated. The Taylor does not come out at the same season. The Snyder, Taylor and Brittony run through a long season, only one variety being picked at a time. We used to have the Early Harvest, but the rust took them. Once when we were plowing our rusty plants up, a neighbor came and wanted some plants of them. Of course we let them have them. Now what I am going to say will answer your remarks. This man took those plants home and planted them. They are fine. He has never had a particle of rust on them since he planted them. He has made money out of them.

Mr. Jacob Faith.—The gentleman is right, it is a root disease. If you will go through a patch and put gloves on your hands and pull the diseased plants up, you will find a little yellow thread. Now when that man put out his plants these little threads were all broken off and they were left in your ground and of course his plants were alright.

Some one asked a while ago if there was any berry out that would beat the Snyder. I have a seedling, it is a little bit later than the Early Harvest and is very healthy and has never had the rust. I think it is going to be better than any berry that I have ever tried.

DEWBERRY.

Mr. Atwood.—Mr. Goodman has had some experience. He has been there. I know of a man who has 4 acres of dewberries and makes more money out of them than he does from his strawberries. He never sells any less than \$1.75. They ship well. He sends them to St. Joe and Topeka and other places. He gets fine prices. I want to tell you how he grows them. He tries to destroy them it seems to me. He will plow them up and the next year have a berry crop that will surprise any one. After picking his crop, he will run over his patch with a mower and then burn them over and you would think he would surely kill them. He does not touch them until next spring and then he cuts their tops off some. But he certainly knows how to raise fine berries.

Question. What variety does he grow?

The Lucretia.

Mr. Evans.—What kind of land did he plant them on?

A land free from stones, and as I said this morning, they believe in getting the land in good order first and then put out your fruit.

GROWING THE GRAPE VINE.

(By Ed Kemper, Hermann, Mo.)

"Growing the Grape Vine, and Planting and Care of the Vineyard," the subject assigned me by the Secretary, is work which I have done ever since I was able to work, but it seems difficult for me to treat this in a short paper.

Growing the Grape Vine.—Years ago there were at Hermann more than a dozen wine growers that propagated vines, but they gave up one after another, saying "this dosen's pay any more;" they had 15, 20 and 25 cents for each vine. Today nearly all the wine growers sell their cuttings to us, and if they are in need of vines they buy them from us, very often asking "how can you grow them at that price?" and all I can answer is, "nowadays you have to see that you get better results."

We grow all the vines from cuttings, including the Norton's Virginia Seedling, Hermann, Cynthiana, Neosho, etc., which in former years it was claimed could not be propagated from cutting successfully.

The cuttings should be cut in the fall or early winter. Cut them 10 to 12 inches long; at the lower bud they should be cut close to or almost through the same, as the roots will start easier; from the upper bud you should have about two inches, so the cutting will not dry out so easy.

Tie the cuttings in bundles of 100 or 200 each; dig a trench, say 12 to 18 inches wide, 14 to 15 inches deep, having it level at the bottom; set the bundles in with the lower bud down and if possible so that every cutting stands on the bottom of the ditch or trench, and they will then be moist enough all winter; cover with soil five or six inches thick. In the spring take them out and set in nursery rows, three to four inches apart, rows about two and one-half to three feet apart, using only good soil well prepared, and be sure and cultivate throughout the summer. It is just as well to set out in nursery rows in the fall, but usually it is too late when the cutting is done.

Planting.—We have found it best to plant in the fall, that is if the season is not too dry, but it should not be done too early; the best time is from the middle to the last of November. In planting a vineyard I would not go to the trouble to dig holes with the spade, as it is usually done, for it can be done in half the time and get much better results by using a team and plow. Plow up a dead furrow as deep as you can, two rounds will do, but three are better, especially if you want the rows far apart, say eight, nine or ten feet; then take a cord or string with knots or anything tied to the same every six, seven or eight feet, as you may wish the vines; stretch the cord along where you wish the row, giving it the height which the field will have when level. By this cord you will know just where and how deep you have to set the vines. Let one man take a shovel and another the vines in a bucket with some water; press or trample the soil firmly to the roots, then take one horse and plow and make the field level. If you use manure when planting be sure and see that you don't get it too close to the roots. Planting should not be done when too wet. Cultivate throughout the summer.

For vineyard select the highest land you have and new ground is the best of all. I have traveled and visited a good many vineyards, and have found that sometimes there is a very great difference in a variety within a short distance; this is, of course, mostly due to the soil. At Hermann the Norton's Virginia Seedling is the most extensively planted; it does well on almost any soil there. Next is the Ives, which does well on poor soil; then comes the Elvira, which wants a rich soil. I would suggest that everybody should first test his own soil before planting large areas of any variety.

Nearly everybody has space to spare in the back yard or garden, and nothing will so improve these places as a small number of well trained grape vines on an arbor.

Take, say a dozen vines, one of each variety, plant them in a circle or any way you may wish them, perhaps along a walk. Of course, not all the vines will do well on an arbor, that is, for shade; yet if some of them do die in after years the others will be strong enough to cover the entire arbor, and you will have seen how the varieties do. Prof. Whitten said to the Horticulture class in February, 1900: "The Clinton and Neosho are the best vines for an arbor, but they are not productive," and I wish to say Prof. Whitten is right. The Hermann is also a very good vine for an arbor, for shade. Secretary Goodman said to the same class in January, 1900: "I think the people in the city should plant a few vines; if they have no other space to spare they could plant next to a wood shed or any other building, and let them grow up." These are wise words from wise men, and people should listen to them. Vines will do very well on a building, but remember that they need cultivation the first few years; also that they should not stand too close to trees.

Care of the Vineyard.—In pruning, I prefer the renewal system; so do all our neighbors in and around Hermann, or say Roark Township, which has probably more vineyards than any other township in Missouri. A one-year-old vineyard should be cut back entirely if not grown very strong; on a two-year-old you may leave one vine two or three feet long, and if it has made a good growth you may leave the vine longer, but not too long, as a young vineyard is easily ruined by overbearing, especially some varieties like the Elvira and Marsala. The third year you may leave two canes, and, of course, two spurs; you should always leave as many spurs as canes. In future years you should always remember that the stronger the growth the more and longer canes you leave, and if the growth gets poorer you have to cut less and shorter canes; this same rule applies to vines on an arbor. In a vineyard get the canes as close to the ground as possible, but don't forget that the bearing canes should come out of as young wood as possible, the spurs, of course, are left for this reason to get bearing canes for the coming year.

Summer Pruning.—Pinch off one joint beyond the last bunch; this should be done before blooming to force them quickly over blooming. Leave only four to six sprouts from below for bearing canes and spurs for the coming year; tear off all the rest that may grow out from below.

I think it unnecessary to say anything in regard to spraying, as

this has been discussed so often. If every member will give his experience the object of the society will, of course, be fulfilled.

“If you have a precious thought,
That to you has gladness brought,
Shrine it not within your breast,
Write it and make others blest!
If you have a loving word,
Speak it where it can be heard.”

GRAPES.

Mr. Rommell.—I am sorry to say that the grape growers of Missouri are just a little behind the times in raising and handling grapes. They just grow them for wine purposes. Every one is familiar with the Concord from the East and yet we never see any of our own raising on the markets anywhere. Our grapes are almost all gone when they come in with theirs. Now I am perfectly satisfied that we can grow a better grape than the Eastern man. It is just because we have not tried it, we do not pay enough attention to it. Of course there is a good deal in the variety of grape. But there is a good deal in the way you manage your grapes. Thinning, pruning, spraying and the like are not done as they should be and I believe that it is because so many of us lack information. We are too old style, we are not up with the times when it comes to the grape question. We still hold to old varieties that we had years, years ago. We have new varieties now and better ones too. Now comes the question which are for market and which are the wine ones? The Virginia is a wine grape. Does very well and is a late grape. Elvira is a first class wine grape and is not as much subject to the rot as some others. The Woodruff is a good grape for table use. It is not very bad to rot.

Of course we do not give a description of the Concord, every one knows it. The only objection to it here is that it rots. Many spray for that and it is alright. But I have raised fine ones by bagging them. I have taken the first prize at the Hermann fair on my grapes. Those were some I had bagged. So many asked what variety they were, they did not know them. They retain their fine bloom on and no rot and nothing the matter with them, perfectly sound and fresh. There is another advantage, they last longer. Of course, they don't ripen quite so early but you can leave them on the vines so much longer. They won't wilt so soon. It will certainly pay to bag your grapes.

Question: When do you put the bag on them?

Put it right over the blossom.

What sized bags do you use?

I think it is the two-pound bags. I put them on just as soon as the bloom drops off. Just slip the bag on, twist it around and tie it and there it is as safe as can be.

If you neglect to put the bags on right away, would you do so two or three weeks after?

I have tried that. I find if there is any sign of rot it will go on. The bag wont save them then. The time to do it is just as soon as the blossom drops off.

Do you think it possible for us here to raise as good Concord here as they do in the East?

Why certainly I do. Yes, sir; we can raise better ones here. Our grapes will be much sweeter and better flavored.

Give two grapes for market use.

Do you want early ones?

Well the best whites, the best reds and the best blacks for market use.

Niagara and Moore's Diamond for the white, Goethe for red, also the Woodruff, and Concord and Moore's Early for black, the latter is not as productive as the Concord. I don't know very much about the Worden.

Mr. Kemper.—Red, Marsala and Woodruff; white, Moore's Diamond; and for the black would say Concord and Moore's Early.

Question: If you would put one in a bag and the other not and could keep both from the rot, would they look like the same variety?

No, sir; not a bit.

A. H. Gilkerson.—That's my experience, too.

Judge Miller.—I think I have tried everything. I am always trying something new. As for the Worden taking the place of the Concord, I can beat that all to pieces. The McPike is a much better grape. I have quite a number of varieties. When I find that I have a good new variety, I keep it and raise it and if a new one proves not so good, I simply drop it. If you want an early grape plant the Early Victor. The Uncle Sam is a new grape and about as large as Campbell's Early. Now some of you may not know the Campbell's Early; it is about the same as Moore's Early. Then I have the Kentucky which is a fine grape.

Mr. Wittenback.—I have the Ives Seedling and the Virginia Seedling, these are mostly for wine. Then I have the Elvira and Woodruff and Perkins.

Mr. Irvine.—I would give the Moore's Early, Worden and Concord. The Worden is the best, but it sheds from the bunch.

FRUIT INTERESTS AND DIFFICULTIES IN MILLER COUNTY.

(J. R. Helfrich, Eldon, Mo.)

Our worthy Secretary requested me to furnish a paper on Fruit Interests and Difficulties in Miller county. As this is my first time with you and my first attempt at anything on this line my paper will be short. There is but little interest taken in fruit growing in Miller county, so it will not require a very long paper to tell it.

In the first place I think Miller county possesses natural advantages for fruit growing equal to any other section in the State. We have thousands of acres of land better adapted to fruit growing than any other crop; but with the exception of a few who have planted small commercial orchards there is practically no interest taken in fruit growing. True almost every farmer grows some fruit for family use, but about three-fourths of these are without fruit nine months out of the year. As I said before we have a few, probably half a dozen, men in the county that have planted small commercial orchards. Among them I might mention Mr. H. R. Kelsay who has about 5,000 apple trees, most of them bearing size. This orchard was planted on old worn out ground that had been cropped principally in corn for about sixty-five years, but the trees are doing fine, have made a good growth and look healthy. Mr. Green says the worst difficulty he has is the root louse and leaf roller. Henley, near Spring Garden, has about 4,500 trees, from three to five years old. The most of them are looking very nice. Another orchard I might mention of about 1,200 trees owned by J. A. Hanly, south of Spring Garden. This, I think, is one of the finest orchards I ever saw. It is twelve years old and every tree about the same size and shape. This and Mr. Kelsay's orchard are proof enough to show what this soil will do if the proper care and attention is given. While the trees grow thrifty they are also long lived. On a farm joining Mr. Kelsay's is an old orchard that was planted in 1834, and a great many of the trees are alive and healthy and bear large crops of fruit.

Now as to the difficulties, there seems to be plenty to contend with. The borers, root louse, leaf roller, rabbits, etc., but one of the greatest difficulties to fruit growing to the fruit interest in this section, is grass. That may seem strange, but to illustrate, I will mention a little conversation I had with a man a short time ago. He said he had

received a letter from a man in Minnesota making inquiries about this country, and he had written him that this was a very good farming country; but not a fruit country. At this point his wife spoke up and said she thought this country was all right for fruit, but there were too many like her husband. They had a beautiful young orchard just beginning to bear and he seeded it to grass and turned the horses and cattle in to eat the grass, the result was the orchard was about destroyed. That is the trouble with about three-fourths of the orchards. As this seems to be a natural grass country and so many of the farmers are more interested in stock than they are in fruit, when they see the nice grass growing in the orchard they cannot resist the temptation to give the stock a treat, so what trees have survived the borers and other insects (which have had full sway in the orchard) the cattle finish. Then these men will say this is no fruit country. However, I am glad to say there is coming a change. The few Joshua's and Caleb's are having their influence and I believe the time is coming before many years when Miller county will be one of the leading fruit growing counties in the State.

FOURTH SESSION.—Wednesday Evening.

The entertainment of the evening was supplied by a piano solo by Miss Hendrick, recitations by Miss Helen Robnett and Miss Trail, and a zither solo.

THE FORESTRY QUESTION.

(By Miss Emma J. Park, Springfield, Mo.)

A late editorial begins: "One of the great questions of the world just now is the future of the fuel and lumber supply." When we know that 90 per cent. of our virgin forests are gone, and we are using today an excess of 33 per cent. of our natural production, we can realize that it is "a great question," at least, with the United States, and that in the near future part of our lumber supply must come from other countries.

Some states have awakened to the importance of a knowledge of forestry and are working to save the remaining timber for a more rational use. Wisconsin has published an interesting bulletin which is

of practical value. Forty years ago the northern half of that state, comprising about 7,500,000 acres, was a continuous forest and less than 20 years ago it was described as one of the densest forests in the United States. Today nearly all the surface is logged over and most of the pines are gone from the mixed forest, and the greater portion from the pineries proper have been cut. Eight million acres are destitute of forest and 40 per cent. of this is entirely bare of wood growth. Only one-eighth of this surface is in farm lands and this unproductive land is fast increasing under the present system of lumbering.

Other states have been as extravagant in their use of lumber. Reared as we have been in a nation's abundance, it is hard for us to realize what this loss of forest cover means to us. The lessons learned by France and Germany, we have not applied to ourselves, in spite of the warnings of nearly a quarter of a century. The loss of wood is but one of the reasons why we should study this question of forestry. There are others that touch more closely the farmer's interest. In planting extensively of fruit it is a well known fact that we should consider the nearby forest growth. Reports from Illinois and Connecticut tell of raising peaches in the days before the forests were cut away. As wind breaks they protect the farm from winter's cold and even from the hot winds of summer, thus modifying the extremes of temperatures.

In the forest the water supply is increased 50 to 60 per cent. above that of an open field, and this extra supply is absorbed by the subsoil and yielded to the springs. On account of the foliage the trees protect the ground and evaporation is less both from the sun and wind. The snows of winter are absorbed more slowly and the ground receives a greater proportion of the moisture. The heavy shower, that beats down in the open field and runs off the surface, in the forest, because of the foliage, reaches the ground with less force and with the litter on the forest floor helps to save to the soil the greater per cent. of the moisture.

In Nevada the forests have been cut from the mountains and the winter snows melt rapidly and rush to the valley below. Irrigation was dependent on the mountain streams, but now, when the water is most needed, the rivers are dry and Lake Humboldt is on a much lower level than the farm lands. Nevada is the only state in the Union which has decreased in population in the last ten years, and it is the forest loss affecting the water supply and farming land that is considered the cause.

Years ago there was a canal cut between the Wisconsin and Fox rivers to allow of navigation. Since the loss of the forests in the north-

ern portion of the state navigation has ceased in the Wisconsin and the Fox has lost much of its force in driving its mills. Rivers that used to float down the logs do not do their accustomed work and streams used at the June freshet have been abandoned. Other portions of the section that were swamps when the surface was covered with forest have become dry and in the clearings grow the aspen, as is the case on the uplands. Less extended areas also have their influence on the water supply. The government has collected a great amount of testimony on this subject which proves that many of our springs are dependent on whether the subsoil has received its supply from the woodland near them. In New York one man told of a beautiful stream on his farm which was supplied from a spring having its source in a wooded hill of two acres. The wood was cut away and the spring became dry, while the hill was dry and useless.

France cut away her forests from her mountains and thousands of farmers either had their farms washed away or covered over by soil and debris brought down by the torrents. It is said that 200 miles from the source of the evil, fertile farms were ruined. In the country tributary to our large rivers many of the forests have been removed and there is an estimated loss from the washing of the floods of 200 square miles of our soil per annum. Truly the engineer needs the forests to aid him in his work against these expensive, dangerous floods. Watch the effect of a heavy rain storm or the quickly melting snow on an unprotected field, see how gradually innumerable rivulets are formed by the water rushing to a lower level, each carrying its particles of dirt to deposit lower down or carry into the streams and by the streams into the rivers. Left unconstrained, these rivulets wash with each rain until gullies and gulches are formed. With the loss of the forest cover the open fields are left and usually fire follows the lumberman, destroying the underbrush which would have protected the ground. The spring rains come and are not absorbed; they rush off in the little rivulets to join the streams; the streams are swelled and they rush on to join the rivers and the united volume is too great for the banks and the river overflows the surrounding country. The sudden melting of the snow in the denuded mountains gives the same result.

Fernow in his "Battle of the Forest," says: "Go to the shores of Lake Michigan or visit the coast of New England, New Jersey, Pennsylvania down to the Gulf and you can see the destructive action of the shifting sands set loose by the improvident removal of the plant cover. Go to the Adirondacks, the highlands of the Mississippi or the

eastern slope of the Rocky Mountains, and aspects similar to those derived from France will meet your view."

France has fertile farms in the Mediterranean and the government is paying millions of dollars in replanting forests to redeem them. We have a Mississippi delta that represents many a fertile farm along the river and its tributaries, and the Mississippi bad lands is a forceful example of our loss.

An editorial states that there are two duties of an American citizen: Protect the birds and plant trees. As trees can thrive on land too poor for the farm crop on the ridges or rugged hillside, why not grow trees on these waste places instead of raising poor crops? The time and thought spent on the better portions of the farm will in the end yield more money to the farmer.

In our own county (Greene), which may not be much different from other sections of the state, the forests are being removed, mostly for firewood. The land is often too rocky and hilly for cultivating successfully and the fields are used for poor pastures or left to care for themselves. If a proper interest could be aroused the valuable timber might be saved for better use and where the native timber needs to be gathered it could be replaced by better varieties. It would mean a study of trees, their uses and their needs, but people should be educated to think beyond the present. Public sentiment must be stirred if there is anything accomplished in this state to save the remaining forests for proper use and to grow valuable timber on land suitable only for forest growth.

Allenton, Mo., May 16, 1901.

L. A. Goodman, Esq.:

Dear friend: Referring to your letter of May 13th, wish to acknowledge receipt of the money order for \$30.00 as prize money and wish to thank you and the society for same, said amount will be invested in nursery stock this fall and the trees will be kept on a separate record known as the Missouri State Horticultural Society Stock.

Signed

F. W. CLOSS.

THE SETTING AND MANAGEMENT OF ORCHARDS IN MISSOURI.

First Prize Essay by Student of the Short Course in Horticulture at Columbia, Mo.

(By F. W. Closs, Allenton, Mo.)

In setting out a commercial orchard, the financial success of the venture depends more upon the quality of the fruit produced than on the quantity. A love for horticulture is probably the prime requisite to success, every detail of the work demanding careful and intelligent attention.

The first fruit to be considered in this paper is the apple, which ranks highest among the cultivated fruits of the State of Missouri.

The choice of a site for the orchard should be governed by several rules; first, by its proximity to transportation; second, by the contour of the land, preferably a north slope; third, by the soil which should be firm with a porous subsoil. The loess formation of the Missouri river hills is one of the best examples of what good apple soil should be. Having selected the ground, ascertain the demand for varieties at the places into which you intend shipping your crop. Consider the productiveness of these varieties, their hardiness, keeping qualities, and ease of cultivation in your region and then plant accordingly. Among the leading commercial varieties in the State are: Jonathan, Grime's Golden, Maiden Blush and Lowell for early fall and the Ben Davis, Gano, York Imperial, Mammoth Black Twig, Clayton, Huntsman's Favorite, Winesap and Missouri Pippin for winter.

Select the varieties you wish to grow, keeping in mind that in order to insure cross fertilization, a row of a different variety than that of which the main orchard is composed should be planted here and there.

Prepare the land early in spring by thorough plowing and harrowing. Mark off the tree rows twenty-five feet apart each way, starting from a fixed base line. The best trees for planting are two-year-old, headed twelve to eighteen inches from the ground and ordered from a reliable nursery. The best and hardiest trees only should have been taken by the nurseryman for selecting both the seeds for the stocks and the scions. When the trees are received, open the bundles and heel them in, giving each tree plenty of room, but

taking care not to leave open spaces around the roots. When ready for planting, prune to a pyramidal form and avoid all forks. It is usually necessary to prune the roots also, but do not leave them mere stubs. The holes for the trees should be about fifteen inches square and deep. Put a little loose top soil in the bottom of the hole, place the tree into it one inch lower than it stood in the nursery, hold it upright and let the roots spread in their natural position. Turn the largest roots and branches to the southwest. Now fill in the soil, shaking the tree gently to sift it well about the roots and then tramp firmly. As a preventive measure against the woolly aphis, two hand-fuls of powered tobacco may be put into each hole before filling. In order to keep away rabbits put a wooden wrapper around each tree; this also lessens the liability of attacks from borers as well as injuries from the whiffle tree when cultivating.

Cultivate the orchard carefully, discontinuing in time to allow the trees to mature their wood for winter. Weather conditions must, of course, regulate this time. It is well to sow a cover crop in late autumn, in order to protect the ground over winter and to prevent the soil from washing. In spring this may be plowed under. If desirable, such crops as tobacco, corn or vegetables which need frequent cultivating may be grown between the rows while the trees are young. Berries also may be profitably grown in this way.

If timber land is to be used for the orchard, cut the timber and burn the wood in fall, allowing the ashes to remain as a fertilizer. Plow the land deeply during winter and cross plow in spring. This new land is very desirable. If the land is old or lacks fertility, it may be improved by deep subsoiling, and then by growing a crop of cow peas, soy beans or clover on it during the summer and turning it under in fall.

When the trees come into bearing and the fruit is about one-third grown, begin thinning out, leaving the apples four to six inches apart. This preserves the strength of the tree and insures a better quality of fruit. Preparatory to gathering, provide the necessary equipment in the way of ladders, sacks, lined baskets, barrels, sorting tables and sheds. Be careful in picking the fruit to twist it in order that the stem may be retained; much harm is often done by indiscriminate pulling of fruit and this point should be given special attention. Only number ones and twos are picked into the baskets, all others being allowed to drop on the ground. Another point here is of importance; in placing the apples into the basket, pickers should not be allowed to drop them from some distance, but should lay them

in carefully, thus preventing any injury from bruising. After all the fruit has been gathered into the sheds, sorting is begun. The apples are sorted into four grades; namely, fancy, number one, number two and number three. For market the first three grades only should be used. In packing into the barrels, place a double layer into the bottom, stem end down, then fill up with apples of the same class; close the barrel and label the faced end. The advantage of this double layer at the top is simply that a better appearance is presented when the barrels are opened, and fruit packed in this way will often bring a better price than when promiscuously thrown in.

The number three apples which are not marketable are good for evaporating; and even number twos may be used if the price of evaporated fruit is such as to warrant it.

Have a good cellar either above or below ground for storing the apples. If it is above ground make it double walled. This cellar should be kept dark, comparatively moist, well ventilated and at a temperature of 35 or 40 degrees Fahrenheit. Keep it thoroughly clean and disinfected, and store only sound fruit.

The apple has a number of insect and fungus enemies to contend with. Among the insects the round and flat headed borers, the codling moth and the canker worm do the greatest amount of injury. As stated before, the wooden wrappers around each tree will help to keep away the borers, but it is frequently found necessary to cut them out. For the codling moth, spray with some arsenical poison within a week after the blossoms fall and several times after that. The canker worms may be kept away by putting some barrier around the trees, and also by spraying with some arsenical poison. Among the fungus diseases are the bitter rot and the scab, for both of which the trees should be sprayed, with Bordeaux mixture. Root rot also attacks the apple.

PEACH CULTURE.

The peach, although a native of a warm climate, has through years of cultivation, been hardened until it may now be grown far north. It ranks high among the commercial fruits of Missouri and has been very successfully grown in the southern part of the State. It is a tree which comes into bearing at the third year from the bud. Propagation is effected by seed, by budding or by grafting; budding being the most successful and widely practiced method.

The best site for a peach orchard is high land, sloping toward the north, and the best soil a sandy loam with a gravelly subsoil. Peach land must be dry; under no conditions will the trees grow in wet, soggy land.

Prepare for planting much the same way as for the apple, planting the trees in spring one rod apart each way. If special care is taken, two-year-old trees can be used, but the best are one year, medium size, four feet high.

The peach requires very severe pruning. The first year cut off all branches, leaving only one bud at the base of each branch and head the trees back to about two and one-half feet. The second and third years prune to a round or oval shape and every year after cut out one-fourth to one-fifth of the wood.

Thin the fruit the same as the apple and begin picking as soon as the peaches part readily from the stem. It may be necessary to make three to five pickings during the season. Pack the fruit carefully, putting the fancy grades into crates containing four or six baskets. Number ones are packed in one-third bushel boxes and the soft grades into one-fourth bushel baskets.

The three most profitable and most extensively grown varieties in Missouri are Elberta, Champion and Crosby.

While there are a number of fungus diseases on the peach, the serious one in this State is the peach rot, for which the trees should be sprayed with Bordeaux mixture. Among the troublesome insects is the borer, which should be given the same treatment as that of the apple.

PEAR CULTURE.

The origin of the pear is unknown. It is a quick grower, fruits early and is free from the attacks of insects. The only draw-back to its culture is its susceptibility to blight. Pears have been divided into three classes; namely, Standard, Half Standard and Dwarf.

The Standard varieties should be budded or grafted on pear stock, and the trees may be planted in poor soil so long as it is well drained. Crown grafting is probably practiced more than budding. Plant two-year-old trees one rod apart each way. Keep the trees headed low, pruning the first year, but after that removing only blighted portions. Keep the sprouts on the trunk spurred back. After three years of cultivation, seed the orchard to grass. A nurse tree is often planted one foot away to the south to rob the pear tree of the soil fertility and otherwise to check its growth, to reduce the liability to blight.

The Half Standards are budded on the apple or quince. When planting, set them so that the bud will be just below the ground.

Dwarf varieties are grafted or budded on the Angiers quince stock. As the quince has a habit of rooting near the surface, a rich loam is the best soil; just the opposite condition from that required

for the standard class. The trees should be planted about $12\frac{1}{2}$ by $12\frac{1}{2}$ feet. Some well tried varieties are Duchess, Buerre d'Anjou and Sheldon.

CHERRY CULTURE.

This fruit, too, may be divided into classes: (1) Morello; (2) Duke, subsweet; (3) Heart, sweet; (4) Bigarreau, sweet.

The Morello, while a native of cold countries, is the most profitable in Central and Northern Missouri, the Southern portion of the State being a little out of range. It bears well and is free from insects. The attacks of birds are the most serious drawback to cherry growing and yet if a grove of mulberries is planted near this difficulty may be done away with almost entirely.

Cherries are either budded or grafted on three different stocks; first, the Mahaleb for Northern Missouri; second, the Morello which, although often objected to because of its habit of sprouting, is good farther north; and third, the Mazzard for the south. Secure good one or two-year-old trees and handle them very carefully in transplanting, not allowing them to dry out. Prune as little as possible as trees are very sensitive to cutting. For this reason also cultivation, which should be carried on for about five years, must be shallow.

The varieties under the four classes are: Morello—Early Richmond, English Morello, Dychouse, Wragg. Duke—May Duke, Reine Hortense, Belle de Choisey. Heart—Gov. Wood. Bigarreau—Napoleon. The Morello class are the most extensively grown (commercially) in Missouri.

QUINCE CULTURE.

This fruit is not so extensively cultivated as any of the foregoing and it will only be mentioned briefly.

The quince is propagated by being grafted on one inch of apple root. The soil should be the same as that for the dwarf pear and cultivation must be the best during the whole of the growing and ripening season. Since the trees like shade, they may be planted between the rows in an apple orchard. If planted by themselves set them $12\frac{1}{2}$ by $12\frac{1}{2}$ feet.

The varieties are Missouri Mammoth which is considered the best, the Orange quince and the Meech.

Twig blight attacks the quince and the only remedy is to cut off the diseased branches.

PLUM CULTURE.

The plum probably extends over more territory than any other fruit and it thrives well on various kinds of soil.

There are four classes; first, American; second, Chickasaw; third, European; fourth, Japanese; the first two being native. Different stocks are used for budding these different classes. The native varieties are budded on Marianna, the European on the Myrobalan and the Japanese on the peach or on the Marianna stock.

Plant two-year-old trees one rod apart each way, and give somewhat the same treatment as for the cherry. If the Marianna stock is used, the soil may be heavy and the orchard needs to be cultivated only four or five years. But if the peach stock is used, the trees must be given the same treatment as the peach. The Japanese varieties had better be planted on high ground and on a north slope for they start early in spring and are very liable to be injured by late frosts.

In gathering both these and the European varieties, the fruits must be picked off, because of their clinging habit, while the native varieties may be shaken off easily.

The following is a list of varieties under each division: American—Wild-goose, Miner, Wyant, Wayland. The Wild-goose plums ripen in about four weeks. There is sometimes danger of their not fertilizing themselves and some other variety had best be planted with them; for example the Miner: European—Damson, Lombard; Japanese—Abundance, Burbank, Red June, Wickson. Of these Aundance is the best, while Red June ripens first.

The plum curculio and the fungus black knot attack the plum. For the former spray with the arsenites; for the latter the only remedy is to cut out the diseased portions.

As soon as the orchard is planted, watch must be kept for injurious insects and fungus diseases; the two principle obstacles to be overcome in fruit growing. Such preventive measures as timely and persistent spraying, removing and destroying all diseased branches promptly, keeping the ground clean of weeds, litter or fallen fruit, encouraging and protectig the birds, and maintaining an active flock of poultry constantly about the orchard, will help us to be victorious in the battle.

In conclusion it may be well to state that there are many other obstacles in the way of successful fruit growing, but the horticulturist with knowledge, alertness and perseverance clears the way and in due time reaches success.

FORESTRY WORK.

(By Prof. H. C. Irish of St. Louis, Mo.)

In discussing this question, we will ask what is Forestry? One of the questions of today is how shall we manage our woods? Now this means a great deal more than we think at first. It means the planting and management of trees. Something must be done along this line. The management and tending of trees is something that will effect every community in a few years. It has its influence on the physical world. It is important to us from two points. First, the effect upon the physical world, and second, is the timber question.

It is not as it used to be a long time ago with this forestry question, we used to take no thought of our trees. But what was right and proper then need not be proper now in this day. We do not realize to what extent this destruction is going on. One of the most destructive agents we have is fire. The census report of 1880 tells that there were about 8 million of acres destroyed that year. Only a few years remain when our country will be bereft of its forests. But I want to dwell more particularly on the management of forests and to consider them from about three points. First, we want to plead for the protection of our forests, then the management, and third, that new ones be planted.

Our Government has reserved several million of acres in the Northwestern states and is trying to protect them as best it can from fires and other things. Some states own forests, too, but most of them are owned by private men. The state of New York has several million of acres in forests. Pennsylvania has some, I don't remember just how much, but not quite as much as New York. They are trying to enact national forest laws, and have these forests conducted on strictly forest principles. Now, what are these principles? I can tell you of some of them. In North Carolina, Mr. Vanderbilt has thousands of acres, and keeps adding to the tract. He is managing his forests on a paying basis of marketing the trees that are large and protecting the small ones and tending to them so they will, in a few years, be ready to remove and make room again for the next smaller ones. He also plants new trees in this way of managing he keeps almost a constant supply of timber on hand. He sells enough timber of course to pay all expenses and at the same time is carrying on quite a number of other experiments in connection. It is a profitable investment. New York is beginning to work along this line. And it seems to me that this principal should be

carried on still further than it is. Now we have large farms that are not good for anything very much, why not put these in forests? It seems to me that we might utilize them for this purpose.

It is a question whether the Government should take up this work or leave it for the private individual. In most cases, of course the returns will be slow about coming in. It would be a long time before any income could be realized. Now the individual could not afford to wait that long. So in such cases it is the duty of the Government to take it up. It will of course cost the Government something to begin the work. But the Government cannot loose a cent on it, and in the end it will mean money gained. If individuals wish to take it up they will necessarily have to invest on a large scale as Vanderbuilt did. We need laws to be enacted along this line. It is indeed a pleasure to see what is being done by some people and by some states.

At present these forests are under the management of the Department of Interior in connection with the Department of Agriculture and the only purpose is to start these principles and recommend them. It seems to me that this should be changed. The whole system should be put under one head. If these principles are ever carried out, I have no more concern about the forests in this country of ours.

INDIVIDUAL EXPRESSION IN FLORICULTURE.

(By Mrs. Geo. E. Dugan, Sedalia, Mo.)

Every living thing in creation seems to be struggling to express its individuality. It appears to be the plan of all life to struggle upward. Sometimes this plan is forsaken by individuals and the result is chaos, moral or physical; often it is both. It is a good thing to express oneself in floriculture and an individual may tell his disposition all unconsciously—in the very plan of his garden.

The "garden spirit" is a good possession. No one knows except its possessor how much real joy comes of seeing things germinate and grow. Nor can any human being tell how very much he is affected by the still life about him.

The perfume of a rose is something to remember; no one ever forgets it. A violet may hide deep in the forest, but when we find it we know that it is a violet, and the recognition of this fact adds to our happiness.

Before the snow leaves the earth the trailing arbutus is in blossom, underneath its covering of leaves and frost; how delighted we are to

find it, and how we wonder at its delicate beauty and its fine fragrance. There are many human lives like these flowers; to know how pure, how sweet, how beautiful they are, one must search them out and form their acquaintance. Why do little children always love flowers? I have seen miniature lords and ladies of American birth and culture radiate divinely under the influence of a handful of dandelion blossoms in the early spring; and when the spring beauties appear every meadow near any town is rife with the happiness of these small people intent on gathering the treasures.

Men risk life and health, forsake home and forego the joy of every home tie to hunt for gold in the weird, wild places of the world, but little children hunt for flowers. Which quest is the better one? A love for flowers always presupposes a desire to cultivate them. A mere wish to pull them, to wear them, to have them without care, is not love; it is covetousness. There are persons who will declare with emphasis that they adore flowers, but who really care no more for them than did the character described by Wordsworth, of whom he said: "A primrose by the river's brim, a yellow primrose was to him. And it was nothing more." There are others who will say with Lee Parker Dean:

"God's gentle breathings are the flowers;
Each lily, rose and violet,
Wooded by the sunshine and the showers,
Is with His fragrant impress set."

We must always wonder at the mysteries of creation. Men in all ages have delved, studied, grown gray, aye, gone mad, in futile attempts to fathom the mystery of life, yet each recurring spring time brings the little blades of grass up from the brown sod, and the green leaves forth from the bare, naked boughs of the trees, and no man knows whence nor how they come. We are each forced to say with England's late laureate:

"Flowers, in the crannied wall,
If I could understand you, root and all,
All in all, I should know what God and man is."

I have little patience with the floral faddist, the one who plants sweet peas and pansies because it is the fashion to do so, or else cultivates chrysanthemums because his neighbor does, or because his florist advises him that they are to be "the flowers this year." There is no expression of individuality in this sort of imitation.

Have you not observed flower plats on certain city or town streets, each so like the other that you have said, mentally, here is the soul mark of just one man; he is the only individual dwelling on this street; he sets the fashion, the others imitate.

Be brave enough, oh, soul, to say your own say, have the flowers

you most admire if they are only potato blooms, or bean blossoms. But you can have better things than these in your door yards, surely, when there is such a vast and wonderful variety of

Little seedlets, brown and bare,
Waiting birth,
Touch of earth,
Little seedlets everywhere.

Buds and blossoms rioting,
On the air,
Perfume rare,
How the birds enjoy and sing.

My memory carries me back to a quaint old-fashioned house, an eastern country home, where the door yard always suggested some weird sweet symphony. A stately soul untrammelled by fashion's dictates here walked in glad freedom amidst the shrubs and flowers.

When the first dawn of spring appeared the snowdrops that border the walk, in generous profusion, came forth to greet the passer by, and just a little later grape hyacinths, ixias, sparaxis and the crocus were in riotous bloom. Then came hyacinths, tulips and daffodils, so that the border was a ceaseless delight. After the bulbs had gone to sleep these borders were always set with pansies, later with petunias, so that there was not a time from March to October without brave show of blossoms along this walk.

This yard seemed to be the home for every known variety of flowering shrub. There were clumps of syringas, clusters of spireas, lilacs, deutzias, snowballs and snowdrops, acacias, California yellow bells, while on porches and trellises were honeysuckles and the white, purple and lavender clematis. The old-fashioned flowers were not forgotten: there were hollyhocks, day lilies, peonies and every variety of the old-fashioned flags, which our grandmothers called "flower de Luce." Great beds of gladioli—which are now called gladiola—were in the garden; also a grand display of the best annuals, such as China asters, poppies, salvias, sweet peas, verbenas, cornflowers, salpiglossis, scabiosa, and there were blue bells, a hedge of rudbeckia, a long row of columbine, and much showing of cosmos as autumn came along. Nasturtiums, both the major and minor, were greatly in evidence, and there were roses of every kind and quality. Among the roses sweet alyssum was freely sown, and there were ever in early spring the forget-me-nots and Johnny Jump-ups," a small variety of pansies, which are perennial. I took my first lessons in flower growing in that dear old door yard and garden, and ascribe to its influence the strong taste in floriculture which seems to be my heritage, and which has ever defied all the set rules and bounds of ordinary planting.

As cities came to usurp the freedom of country life, and ground became too expensive for front yards, city people who loved flowers and whose front yards were only brick sidewalks, were obliged to put their plants and seeds in the rear, if they had any at all, and so grew the fashion of back door flower gardens.

The silly country man who visited his city cousin observed the rear flower growing, went home, despoiled his front yard and did his utmost to conceal his shrubs and blossoms, as if they were things he was very much ashamed of, until the passer-by in the country no longer looked on beautiful flowering shrubs and cheerful annuals, but instead beheld stretches of bare green grass, like a meadow until the sun of summer came and scorched it brown, when it became a tangly, withered offense to the human vision. How prettily a bit of bright color might have relieved this somberness, but the eye sought for it in vain.

Imitation is said to be complimentary, and may sometimes be forgiven, but the floral faddist should not be encouraged. Put aside the catalog that tells you what flowers are to be fashionable this year, and give your order to the firm which simply advertises their wares and tells you how to grow seeds and to care for shrubs and plants.

In reference to planting, the only rigid rule to be observed is in regard to time of planting and condition of soil. Most shrubs will do better if planted deep in good, rich, but not heavy soil. It is best to provide root drainage for most shrubs; for roses this is absolutely necessary unless the soil is of the deepest and richest loam.

Deep planting does not do for such shrubs as have their rootlets near the top of the ground. A snowball will thrive best when not set too deeply. I find that roses do best when provided with leaf mould, a good substitute for which is well rotted chip dirt. It is well to mulch roses the first year with old straw or hay and they like extra feeding in the way of liquid applications, or of commercial fertilizers. Most small seeds require merely to be sown on top of the soil with no earth covering whatever. Such seeds as those of the poppy, petunia, Kenilworth ivy and all others of similar size will sink into the porous soil, take root and grow best if not covered. Sweet peas must be planted very early and deep, five inches is not too deep, and March is not too early. Asters are as easily grown as lettuce, and in beds prepared quite the same; if the soil is good and the seeds sown in April, you may expect a fine display of flowers. Bulbs in this climate should be planted late in October or early in November. I find that nearly all the hardy bulbs thrive best for me when not often disturbed. Some florists recommend frequent replanting for change of soil conditions, but my experience is that a good bulb will grow better if kept well enriched—for at least seven or eight years. Daffodils and the

lily of the valley will multiply and grow better for a dozen years if they are not confined in too limited a space. I have a crocus bed that has not been disturbed for 12 years and it has grown to be a magnificent collection, with colors ranging from purest white to deepest purple; some are striped, purple and white, while others are a deep rich yellow. I have a grand bed of the lily of the valley; it is on the north side of the house and for effect I have planted the blue flowered evergreen myrtle among the plants, the myrtle in no way seems to incommode the bulbs and it grows very luxuriantly.

It is not difficult to grow flowers if one really cares to succeed. I would advise the amateur to begin with those of easiest cultivation and not try to have a great many at first. Where a woman does her own housework and cares for a family the fewer flowers she has the better. I would recommend for the busy housewife nasturtiums for table vases and geraniums for yard display. Of all the hardy shrubs the finest in my estimation is the *Spirea-Van Houttei*. The hardy rambler roses are of the polyanthe class and very satisfactory. The crimson is a general favorite, but the white, the pink and the yellow are all good, and will pay well for planting and culture. In shrubs one should always have the white and the Persian lilac; they bloom early, grow easily and have pretty foliage.

I would like to emphasize the fact that a few shrubs and plants well cultivated, properly pruned and cared for, will be far more pleasing than many which may suffer from lack of attention. I would also, in closing, once more say that individual taste or expression in floriculture should not be despised or discouraged.

I have seen lovely hedges of hollyhocks and if my taste ran to peonies exclusively then I would be a peony specialist; but I would not grow things I did not care for because it happened to be a fad of my neighbor or the fashion of a day or year.

Express thyself, oh, living soul.

Thy right to think is not of man;
God giveth thee a deathless role.

Be faithful to His word and plan.

The flowers bloom where'er they are,
Each in its place smiles to the sun;
Not one small plant the pages mar,
Its mission o'er, its life is done.

Not so is the immortal soul;
It ends not here the task begun.
But where eternal ages roll,
Work here commenced shall there be done.

FIFTH SESSION.—9 A. M. Thursday.

The house was called to order by the President, and prayer offered by C. W. Murtfeldt.

 COMMISSIONER HORTICULTURAL EXHIBITS.

Office of the Missouri Commissioners to the
 Pan-American and Charleston Exposition.
 No. 9 Inwood Place, Buffalo, N. Y., June 4, 1901.

MR. L. A. GOODMAN, *Secretary State Horticultural Society, New Haven, Missouri:*

My Dear Sir and Friend.—I regret very much that I cannot be with you at the summer meeting. It was fully my intention to be there, but on my arrival here a few days ago bringing with me a car-load of strawberries from Monett, Mo., which have just reached Buffalo, and must be unloaded tomorrow morning, and as I wish to put about one hundred cases on exhibit—of “24 qt. boxes to each case”—you will know that I shall be very hard at work, as I want to have them passed on at once.

I will, however, thank you to remember me kindly to all of Missouri's horticultural members and others who will attend your meeting. Tell them that Missouri is in the forefront on apples here, and I hope to keep her there throughout this exposition, and will also show what we can do with other fruit.

Hope to hear from you and other members of the State Horticultural Society, and wishing for you a well attended meeting, I am,

Yours very truly,

CLAS. C. BELL,

Commissioner Horticultural Exhibits.

N. B.—I have arranged to give all of the horticultural societies space in my fruit exhibits, and any fruit sent to me shall have my prompt and best attention, and any awards will go to the grower.

BELL.

 LARGE BERRIES FROM MISSOURI.

A whole car-load of strawberries—delicious strawberries, the kind that is usually seen in pictures: fine, large, rich, ripe, red, juicy strawberries, that make the mouth water—were placed on exhibition in the



MISSOURI FRUIT AT PARIS, 1900.

Horticultural Building at the Pan-American Exposition yesterday. The pleasing odor of the luscious fruit permeated the whole building, and hundreds of visitors stood before the exhibit, breaking the tenth commandment and wishing that they could become possessors of at least a small part of the display. The berries were shipped by the Monett Berry Growers' Association.

In the display are 16,400 quarts, and they were shipped by freight, leaving Missouri six days ago. The berries look as fresh as if they had been picked Monday. Every berry is perfect, and upon examining the baskets it will be found that each berry is large, whether found in the top, bottom or middle of the box. In this the display differs from the Eastern market berry, where, without fail, large berries remain on the top of a basket and small ones work to the bottom.

BERRYLAND.

The berries come from the gardens of Southern Missouri, and there are seventeen exhibitors. Commissioner Bell says: "The principal berry points are in Southwestern Missouri, at Monett, Sarcoxie, Peirce City, Neosho, Carthage, Springfield and Missouri. In the exhibit at the Exposition are nine varieties—Gandy, Burbach No. 5, Aroma, Phillips, Seedling, Saunders, Star, Warfield, Haverland, Clyde.—From Buffalo Courier.

Mr. Erwin: I would like for Mr. Goodman, or some one who is familiar with the work, to tell us about the time and how to pack and all about it.

Mr. L. A. Goodman: Peaches must be ripe, not soft. Put in one-third bushel boxes or a four-basket crate, each holding about one-half a peck. Wrap in tissue paper, wrap good and pack in so that they can not move. That is the way we sent them to Chicago and Omaha and they carried there alright.

Mr. Erwin: Suppose we should find a fine, big cluster of peaches, would you pick them off or could you pack them whole?

Mr. Goodman: I do not think it is necessary to send them in clusters. You can't ship them in cluster very well. You would have to be very careful in wrapping them in cotton batting and see that the stems were all wrapped, and then if they were not very careful in unwrapping them they would pull them off.

Mr. Erwin: Would you pick the peaches from the stem or leave it with it?

Mr. Goodman: The peach does not need the stem with it. It is not like the apple. You may cut the stem off with it, but it will come off anyway. All you need to be careful about is not to break the skin anyway. That's all.

W. A. Gardner: I would suggest the California box for shipping peaches in. You can wrap them and put them in these boxes and they can be carried without the slightest injury.

Mr. Murray.—We use the one-third bushel boxes. You can pack them in tight enough so they won't shake.

Mr. Nelson, Sr.—What little experience I have had, I like the 4 or 6-basket crates. The same as is used for shipping tomatoes. Wrap the fruit in paper and it will go through all right.

W. A. Gardner.—I don't suppose it makes any difference what kind of a box you use, so the fruit is well wrapped and put in well.

Remarks from Mr. Goodman urging a good attendance at the meeting in Buffalo this fall, as representatives from nearly all the European countries will be there. Said he would like to have a good delegation go from the Missouri Horticultural Society.

Mr. Murtfeldt.—I would like to have about five minutes here. I would like to put in just a word or two. Now my friends, if you can't see it, I will tell you that I am a very old man, and cannot meet with you very often after this. I congratulate myself on being a member of this meeting. Where I was born (in Germany) before it became an empire, we lived on the border line of Prussia, and they have salt mines over there, and they charge their own people more for their salt than others. And there was a difference in the salt, too. So much so, that the subjects would go across the line to buy their salt. They were in danger every time of being shut in, but they would risk it. Now I want to say a word about our own apples. I am acquainted more with them than anything else. Commission men of St. Louis often meet. I once went to them and asked for Missouri apples. They did not have a one. Have you the New York apples? Oh, yes, sir. I asked them if they had no Missouri Ben Davis and they told me that they could not get them. Now, why is it we cannot buy our own apples in our own State? I think we should see to it that we can.

Your Committee on Fruits respectfully submit the following report:

The show of fruit, though by no means large, was exceedingly fine. In the matter of strawberries there was not a single box shown but was worthy of attention and consideration. These exhibits are object lessons, and are of the highest importance to the horticulturist in determining

what to plant. Your committee has deviated slightly from their instructions and awarded two premiums for the best two boxes of strawberries on exhibition.

Best was for Bubach, Fred Howe, \$2.00; second best, Nick Ohmer, \$1.00.

To D. A. Robnett, for a collection of six varieties, viz.: Jesse Bubach, Haverland, Beederwood, Gandy and Clyde, \$5.00.

To Jacob Stocke, St. Louis, collection five varieties, viz.: Gandy, Marshall, Brandy Wine, Clyde and Bubach, \$3.00.

This collection had been carefully selected but had been picked so long that they did not show quite up to requirements. We beg to mention an exhibition by same of three magnificent heads of Cauliflower.

To James Lugan of Canton for three varieties, viz.: Bubach, Clyde and Haverland, \$2.00.

To A. T. Nelson, Lebanon, four boxes Bubach, \$1.00.

H. W. Jenkins, Boonville, for Greenville, \$1.00.

A new strawberry by Geo. T. Tippin of Monett, grown by William Bowers, was very large, but had been picked so long we could not determine its character, being quite sour and badly shaped. We regret this very much as the size was up to the first. There was on the table three varieties of apples by Mr. Von Buskirk of Oregon, viz.: Jonathan, Winesap and Ben Davis, for which we award \$1.00.

We would mention appliances on exhibition: A dust sprayer by Mr. J. J. Kiser, Stanberry, Mo. An evaporater by Thomas and Davis of Jefferson, Oregon.

FRANK HOLSINGER,
D. A. ROBNETT,
J. E. THOMPSON.

REPORT OF COMMITTEE ON OBITUARY.

To Officers and Members of Missouri State Horticultural Society:

Full two years have passed since we were called upon to devote a page of our minutes to the memory of a brother called from his labors of love and mercy. In this we have great cause for joy and thankfulness.

But today we are asked to think lovingly and speak kindly as we mourn the loss of a most estimable man and brother, who has gone to enjoy the fruits of a well spent life beneath the shade of the trees of eternal bliss.

Last April, Captain Thomas W. Guant, at his home in Maryville, died of acute neuralgia of the heart, suddenly developed, no doubt, from sunstroke, la grippe and progressive paralysis from which he had suffered for some fourteen years.

He was born in Kingston, Staffordshire, England, April 4, 1830, and was therefore only 71 years of age at the time of his death. But he was a busy man, a public spirited and enterprising citizen. He was a son of a florist and had received in his youth a good business education, and a practical knowledge of the nursery business. In 1856, in the 26th year of his age, he laid the foundation of a successful nursery at Maryville, thus becoming a pioneer fruit-grower in our great Northwest Missouri.

Of course he lost no time in becoming a member of the Missouri Horticultural Society, and in this relation he was loved and honored by all who met him here and enjoyed his wise councils and felt the magnetism of his enthusiasm.

From his youth he was a consistent christian, and in his manhood days a staunch advocate of temperance reform. Into his church work he carried the same earnestness, determination and enthusiasm, tempered by the love of his great altruistic heart, that characterized him in all his business relations. He therefore not only helped his fellow man to produce the fruits of the orchard and the vine, but also the fruits of righteousness and of devotion to the good, the pure and the true.

We do well to mourn the loss of such a man, and to resolve, that in his departure this Society has been deprived of a most useful member and our State of a most valuable citizen; that this Society deeply sympathizes with his bereaved family, and particularly with his two daughters, Misses Carrie and Gertie, now orphans indeed, who lovingly cared for the father in his declining years, and smoothed his aching brow when he died; and that we request our Secretary to furnish them a copy of this notice, and spread the same upon the records of this Association.

C. H. DUTCHER,
H. C. IRISH,
J. W. GREENE.

REPORT OF TREASURER, A. NELSON, JUNE 4-6, 1901.

Receipts.

Dec. 31, 1900, Balance on hand.....	\$94 54
Jan. 31, 1901, Cash from State Treasurer.....	757 90
March 31, 1901, Cash from State Treasurer.....	648 13
Total receipts.....	<u>\$1,500 57</u>

Disbursements.

Jan. 31, Express \$1.00, 57c, 30c, 75c.....	\$2 62
Express 30c, 30c, 25c, 25c.....	1 10
Wrapping paper, K. C. Paper House....	3 91
P. O. Bill, Columbia.....	4 00
Express, Columbia.....	2 40
Expense on Report.....	19 25
P. O. Bill, Westport.....	3 14
Salary of Secretary and Typewriter, Jan..	86 66
Warrant No. 470.....	<u>\$123 08</u>
Feb. 12, E. W. Stephens, 2M Labels.....	\$5 00
P. O. Bill on Reports.....	90 54
Pacific Express on Reports.....	50 67
American Express on Reports.....	63 07
Wrapping paper, boxing and shipping Reports	30 00
Warrant No. 471.....	<u>255 68</u>
Feb. 15, P. O. Bill, Columbia.....	\$4 00
One-half expense send Reports from Col- umbia R. R., \$5.00: Board, \$13.00....	18 00
Armour Packing Co., Express.....	21 71
P. O. Bill.....	16 00
Salary Typewriter and Secretary, Feb....	86 66
Warrant No. 472.....	<u>145 71</u>
March 26, N. F. Murray's expense at Horticultural Institutes, Southeast Missouri.....	\$19 65
Express 65c, 40c.....	1 05
Photo, Paris display.....	2 50
Freight, 2 box books.....	1 62
Freight, 3 box books.....	9 18
Drayage	3 00
Salary Secretary and Typewriter, March.	86 66
Warrant No. 473.....	<u>123 66</u>

April 30,	Fruit Trade Journal.....	\$1 00	
	P. O. Bill.....	20 00	
	Express	1 25	
	Hudson-Kimberly, 5M letter heads and envelopes	39 35	
	Salary Secretary and Typewriter, April.	86 66	
	Warrant No. 474.....		148 26
April 30,	Prize Essays, F. W. Closs, first.....	\$30 00	
	V. S. Traughber, second..	20 00	
	G. H. Malone, third.....	10 00	
	Warrant No. 475.....		60 00
May 27,	Express	60	
	P. O. Bill.....	\$27 00	
	Scotford Stamp & S. Co., P. O. cards, etc.	6 25	
	2,000 Programs.....	12 50	
	2,000 Fruit Reports.....	4 75	
	Salary Secretary and Typewriter.....	86 66	
	Warrant No. 476.....		137 76
	Total	\$904 15	
May 27,	Balance in Treasury.....		506 42

We, your Finance Committee, have examined the accounts of the Treasurer and find them correct as reported.

J. C. EVANS,
M. BUTTERFIELD,
A. H. GILKESON.

On motion the reports of the foregoing committee were received and adopted.

Invitations were presented to the Society for the winter meeting from St. Joseph and Springfield; and from Eldon, Miller county, and Salem, Dent county, for the summer meeting.

REPORT FROM ARKANSAS.

The Benton County (Ark.) Horticultural Society is in its ninth year and has a larger membership and a better attendance than at any time since its organization. Its members study horticulture as a science and no publication is as highly prized as the Annual Reports of the State Horticultural Society of Missouri. The officers of this society are C. J. Eld, President; I. Henthorn, Vice-President; I. B. Lawton, Secretary, and Geo. Bill, Treasurer.

Fruit prospect are excellent and the orchardists are spraving liberally. The cold storage facilities of Benton county will be largely increased this year.

I. B. LAWTON.

Reports of different counties regarding the prospect for fruit crop of this year.

Mr. VanFleet of Salem, Mo.—We have a fine prospect for fruit this year. Our apples are fine. Red June and Ben Davis are full. I never saw a finer prospect for peach. I will have to thin my Elbertas down about half.

Question: Is not your fine prospect due to the fact that most of your orchards are young?

VanFleet.—It may be. We have a great many young orchards but some old ones.

Mr. Nelson.—Our crop is not as good as it is sometimes. I do not think we have but about half a crop. But the young apple trees are all better, they have a fine crop on them. Now our peach crop is all right. We haven't many very large orchards but they are certainly fine. We will have to thin them and thin heavily. The varieties of apple are Ingram, Gano, and Winesap. These all are pretty full. But the crop of Ben Davis is very light indeed.

Mr. Evans.—In Clay county, our apple trees will all fail with the exception of Ben Davis. Our orchards are hurt by the Canker worm. What peach trees we have are all full. Would say our per cent. will be about 50.

Mr. Goodman.—The young trees, with us, will be full, about 100 per cent. on them. But trees of about 15 years will not have more than one-half crop. Taking it on a whole Jackson county will have about one-half crop.

W. A. Gardner.—Our apple crop is about 125 per cent. Splendid crop. A full crop of both peach and apple. The varieties are Ben Davis, very full, and York Imperial, Romen Beauty, Jonathan, and the Clayton, well, nearly all varieties. Ben Davis is the main variety down there.

Mr. Atwood of Springfield, Mo.—Our crop of apple is better than ever. Newton county has the best prospect they ever had in this world. Good crop nearly all through the southern part of Missouri.

Mr. Haseltine of Greene county.—About three-fourths of a crop in Greene county. Some trees are very full and some a little shy. We have Ingram and Ben Davis mostly.

J. J. Kiser of Gentry county.—Jonathan, Ben Davis, and Willow Twig did fair to have about half a crop. Our peach are entirely killed.

Mr. Waters of Canton, Mo.—The apples of Northeast Missouri were injured by the cold weather. The Ben Davis did not bloom out well. The Jonathan look pretty well, but did not blossom. I would give our apple crop at about 40 per cent. Our peaches are fine.

Mr. Jacob Faith of Vernon county.—The apple crop, I would judge, is about 35 per cent. this year. Winesap about 15 per cent. of a crop. Jonathan about 15 per cent. and Ben Davis about 20 per cent. of a crop. Our peach trees are all loaded and should be thinned.

Dr. Green, Livingston county.—Apple about 50 per cent. Ben Davis sometimes full and sometimes not. Williwow Twig, very full, Maidens Blush, full crop, Gano, full crop and Jonathan not very much. We have a very full peach crop. Plums a full crop. Peaches full. No pears, one-third crop of Raspberries, one-third crop of blackberries.

J. R. Helfrich, Miller county.—Apple will be about 75 per cent. Ben Davis very full. Peaches loaded. Pears scarce, plums all right.

Mr. Murtfeldt of St. Louis county.—Ben Davis very full, Red Astrachan never fails. Rawls Jennett never does anything for us. Pears full. Seckle never blights.

Randolph county.—Our Ben Davis have but very little fruit on them at all. Some young trees have some fruit. They are suffering from the Canker worm. Cherries good, pears doing very well and peaches loaded.

J. T. English, Cole county.—Apples pretty good. Full crop of apple and peach. Our Apples are mostly Ben Davis.

Moniteau county.—The orchards from 15 to 16 years up are pretty good. The young trees, especially Ben Davis, are very shy. But we will have about 75 per cent. of a crop any way. Never saw trees looking better. Peaches, a full crop—as full as they can be. Pears are shy. Cherries and plum full.

Franklin county, St. Clair, Mo.—In our part of this county we will have about 40 per cent. Peaches full. Red Astrachan, Rambo, Willow Twig, Ben Davis and others full.

Montgomery county.—I never saw such a peach crop as we have this year. Young trees and old trees, broken down trees and all kinds are loaded. I expect about one-third of an apple crop.

G. W. Waters, Callaway county.—Our orchards look well. Our old trees are bearing. Old Ben Davis trees. Jonathan are on a strike this year. Rome Beauty full, two-thirds of a crop. Peaches, full. Pears doing very well. Cherries and plums, a good crop.

S. Y. Thornton, Cooper county.—Ben Davis and Gano have a full crop. Jonathan small crop, about one-fourth crop. No Jenetons at all.

N. F. Murray, Holt county.—We reported about three-fourths of a crop sometime ago. That report was too high. The varieties that are bearing mostly are Winesap and Jonathan. We have about one-half crop of apples. Peaches are full, cherries full, pears nothing, plums very full.

Mr. Chubbuck.—What do you mean by half a crop?

Some member.—Any one can answer that, about 50 per cent. I would say.

Mr. Chubbuck.—How many bushels?

Member.—That depends on the size of your tree.

Secretary.—If the tree would hold and ripen say 10 bushels and from the appearance we should estimate there would not be more than five bushels, we should call it 50 per cent. No tree should hold more than a full crop, and this "full crop" should be our guide or what we would call 100 per cent. Our estimates should always keep this standard in mind. Per cent. of an "average crop" is an entirely different thing. We might have 300 per cent. of an average crop, but never of a "full crop."

Prof. Stedman of Columbia, Mo.—Ladies and gentlemen: I will try to be very brief. We have been talking so many years about insects. This year we have in our midst an insect, that as a rule, is not very common. It curls up the leaf and feasts upon it. This season it has not only fastened itself to the leaves but has united several leaves, and has been working on the fruit itself. They can be found in the apple, cherry and plum. And as far as I know, no fruit is exempt from them. They eat the seed and pulp and will eat it all. These little insects are hard to find from the fact that they keep themselves rolled up in the leaf. But if we can reach them with any poisonous spray, it will kill them. We can kill the most of them, but I tell you, it will take time to do it. We want to instruct how to reach them with a spray. I will give you some idea of what these insects are doing. They have ruined some orchards entirely. In other orchards they have done about 90 per cent. damage. I say some of our trees will not have any fruit on them at all on account of this little insect.

Another insect is the Curculio that works on the peach. These little things can be detected now and can be for weeks to come. They come from the peach. If you will cut the peach open you will find inside the seed the little larva of this insect. Now we cannot spray for them. The only way is to jar the trees when the insects are laying their eggs and catch them on a sheet spread down for that purpose and kill them. Now these are the two insects that are doing the most harm for us this year. The Canker worm is with us always. This insect is so easy to fight and is so common that I will not need to say anything about that at all. No one need to be troubled with them.

Question by Kiser.—Does this little insect that rolls up the leaves actually eat them?

Stedman.—Yes, sir; it eats its way through.

Dutcher, of Warrensburg.—When is the first time that we should spray for the Canker worm?

Stedman.—Spray just as quick as you notice the insect there. When they are young they are easy to kill. If you spray for the Codling Moth, you will not need to spray for the Canker worm. Put about one pound of poison to 150 pounds of water, one pound to 125, if you wish, but you are likely to burn the leaves if you are not careful. There is danger of hurting your fruit when it is in full bloom.

Question by member.—Would it not be well to put in some Bordeaux for scab when you spray?

Stedman.—Yes, you could do so. I don't advise people to spray before the tree blossoms out, for insects that you think might be there. The only insect that you need to spray for is the Codling Moth. Yes, sir; you might put in a little Bordeaux for scab when you spray when the leaves are out. Now if you are going to put Paris Green in your mixture, it will do no good unless the leaves are all out, then it will do good.

Question by a member.—How do you band your trees?

You mean what to band your trees with? Take some wire net, cut it into bands about 4 inches, long enough to go around the tree, scrape the rough bark off the tree and put them on. Drive a tack in the tree to hold it at the top. Have it fit around the top and wide at the bottom. These will stay about two years. This is a pretty good thing for the Canker worm. I would put these bands on in the latter part of September. They will cost about one cent a tree. Leave them on till spring. There are two species of the Canker worm. One in the fall and one in the spring. They will try to go up the tree but cannot get through the net. Sometimes you can find them sticking in the cracks.

Dr. Green.—Are there not instances when they are carried up the tree on the wings of their husbands? Could we not put something on the tree to burn their feet as they go through it and kill them?

Prof. Stedman.—No, not very well. That doesn't happen very often.

Member asked about cotton batting bands.

They are alright, but the drawback is that when it rains, they are all beaten down. The wire ones will last about two years.

Mr. Nelson.—I like the cotton batting fine for bands. They are profitable with us. The insect gets all tangled up in the folds of it.

Mr. Edwin.—There is a question I would like to ask the Professor. I want to know when we spray if we do not destroy our friends

as well as our enemies in the insect line? I would like to know about this.

Prof. Stedman.—If we spray for the insects that eat parts of the plant there is no danger of killing any beneficial ones. The insects that eat part of the plants are harmful ones. The beneficial insects are those that eat other insects. If we spray with the intent to reach that insect, we will kill it. Take plants and experiment with them, you will find a number of good insects. When we spray for all insects, we will kill the good as well as the bad.

D. A. Robnett.—About leaving those bands on the trees. I find that you can leave them on too long. The trees that I tried, I put the bands on and left them for about four years, and I found the tree had grown so rapidly that there was loose bark sticking out through the little cracks and the female could go right up the tree. These were young trees and I found that I had to go through and loosen the bands.

Prof. Stedman.—Well, it may be in some cases where the trees are young.

Mr. Erwin.—I want to ask another question. Do these bands do any good for the borers? My son put several bands around our trees for borers and on examination I thought that it proved an injury. The borers seemed to get there and then could not get out and bored little holes all around the tree. I thought they did more damage than the Canker worms were doing.

Prof. Stedman.—As a rule they do much good. That might have been the pin hole beetle in your trees.

Erwin.—It made a little hole that came to a point and it was a black beetle.

Prof. Stedman.—Well, I don't think the bandage had anything to do with that at all.

BITTER ROT OF THE APPLE—WHAT IT IS, HOW IT SPREADS, WHAT IT LOOKS LIKE.

(By Prof. Herman Von Schrenk, St. Louis, Mo.)

The bitter or ripe rot of apples is a disease which annually destroys thousands of dollars worth of apples, and it is on that account a trouble which is deserving of the most careful attention of all fruit-growers. Geographically, it is widely distributed, for it is common in all Southern states destroying apple crops from Virginia westward and from Central Illinois southward. It does not appear with the

same virulence year after year, being very severe in years when the latter part of the summer is hot and wet, less so in dry, cooler summers.



APPLES AFFECTED WITH BITTER ROT.

The appearance of fruit affected with this disease is a familiar one to the orchardist of this state. In the last ten years, with the ever increasing acreage of apple orchards, there has been an apparent increase of bitter rot, but this is due, largely, I believe, to the greater number of apple trees grown. Late in the summer, usually the latter part, of August, when the apples are almost full grown, and ready to harvest, the fruit shows little brown spots. If the weather is warm, and in a damp atmosphere such as characterizes many sultry days in the southern parts of this State, these spots very rapidly increase in diameter, looking like almost perfect circles. The spots, when almost as large as a five-cent piece, appear blacker toward the center than on the outside, and the whole area is somewhat depressed. At about this period small black knobs, about the size of a pin head begin to appear near the middle of the diseased spot, and as the latter continues to grow these black elevations increase in number, new ones appearing farther from the center. (Note illustration shown herewith.) If but one decayed spot has started on a fruit, it grows until it touches the stem on one side and the calyx leaves on the other, then gradually circles around the fruit until the whole apple is a black mass. The fleshy portion of the fruit, under the decayed spots is soft and mushy, and has very little taste, hence the name "bitter rot." Where there are two or more initial spots, the whole apple turns to the dark brown mass very much sooner. The little black spots in the center of the decayed areas by

this time show, when examined closely, little glistening knobs on the top of each elevation. These knobs consist of thousands of spores, which may be carried off from one fruit to another.

To the average observer there is something uncanny in the rapidity with which a crop of fine apples is attacked and destroyed in the course of a few days, before one's very eyes, and the consciousness that we appear to be powerless to stop the destruction does not add to one's comfort.

The very important question in any matter of this kind is, What can be done to stop this disease? Before entering upon this phase of the subject, I wish to invite your attention for a little while to some facts we have been able to discover as to the cause of this disease. It is common practice, well known to all of you, that when we wish to conquer an enemy, we do our best to discover his weak points: Where he spends his time and what he does, so that we may surprise him when he is not looking. Strange to say, many of us seem to forget that those things which go on about us in the fields and in the orchards, our insect and fungus-enemies, are in many respects like the enemy in the trench, always at hand, even when we do not see him. We become aware of the curculio, the borer, the scab, and the bitter rot at certain brief times, and when the enemy is upon us and has beaten us, then we bemoan our fate and speak of hard luck and poor land and what not. Let us, therefore, confront our enemy, the bitter rot, and ask, what is he like, where is he when we do not see him, how does he spend his time? and perhaps we can catch him unawares.

We have found that the diseases of plants are due to two main factors: unfavorable growth condition and attacks of insects or fungi. The bitter rot disease belongs to the second class. It is caused by a fungus, which grows in the ripened fruit and by so doing brings about its decay. All fungi propagate by means of spores of one kind or another, small microscopic cells, which are carried about by the wind, by insects, birds, water and other agencies. If we were to examine one of those glistening drops on the top of one of the black



knobs mentioned above, as occurring in the center of a rotted area, we would find that it consisted of a great mass of spores, such as you see before you (Figure 1). They are elliptical bodies, which when brought into a drop of water, germinate or sprout very readily. At first one or two threads

come out from each spore. (Figure 2), which rapidly lengthen the branch. If sufficient food, for instance, sugar is given them these threads grow out in all directions with equal rapidity, and soon form a circle, which increases in diameter very quickly. If

such a spore sprouts on an apple, the threads grow into the cells of the skin. They give off a peculiar substance, called a ferment, which

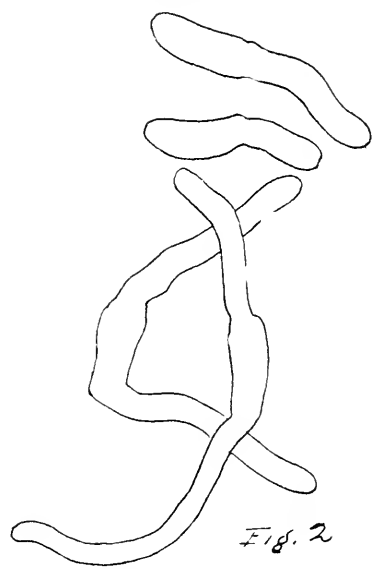


Fig. 2

dissolves the starch grains of the apple; (these in the ripe fruit completely fill the cells). In figure 3 you see some starch grains from a healthy apple and in figure 4 similar starch grains after the bitter rot fungus has dissolved away most of the starch. The threads attack the sugar in the cells, likewise the cell walls. These cells are at first united into one mass, but very soon after the fungus has begun to grow in them the cells fall apart. They have turned brown by this time. You will now readily understand why it is that the little spot where the fungus started looks brown, and why the flesh underneath is mushy and

soft. All the starch and sugar has disappeared and this has left the cells empty. The starch and sugar serve as food for the fungus and cause it to grow more rapidly. Starting from a center the threads radiate out as described, and that explains why we find the black rotted spots increasing in such a very regular circular manner.

When the spot is as large as a five cent piece, enough starch and sugar has been absorbed to allow of the formation of fruiting bodies. Certain of the threads near the point where growth began form dense, black masses, which consist of hollow more or less flask shaped bodies. In their interior, the spores are formed, growing on short stalks. During the night when it is moist, these spores flow out through the openings of the little flasks, and there we see them the next morning as glistening drops. Such is the manner in which the fungus grows.

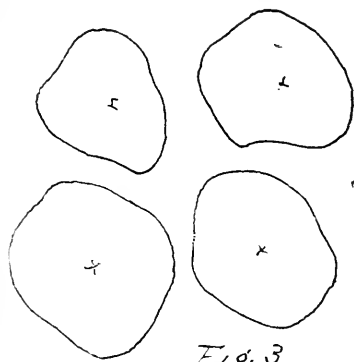


Fig. 3

Now, what is it that happens after this? Rain or dew may wash thousands of these spores from one diseased fruit to another, and that may account for the many infections. The spores may also spread through the air and thus affect otherwise sound fruits. We have

too little information as yet which would enable us to say positively as to whether most of the infection is carried from one fruit to another. However, that may be, and it is a point which we are now trying to solve, the rotted apple, when it falls from the tree has many thousands of these little fruiting bodies on it, each with countless thousands of spores. During the past six months we have carefully examined many of the shriveled mummies lying under apple trees, from this State and several others, and invariably we have found thousands of spores in these fruits: and what is more, these spores sprouted very readily in drops of water. During the winter and spring with every

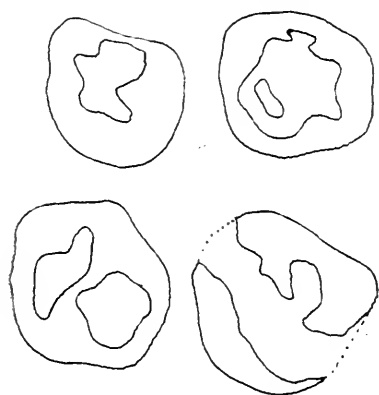


Fig 4

rain which soaks these old fruits, more and more spores escape. We do not as yet know where they all go. Some certainly lodge in the branches and bud scales. We found several cases where spores had adhered to bud scales, but our investigations are not more than begun concerning this point. It can be said with safety, however, that the last year's spores are somewhere in the orchard where they get at the fruit in due time. We are now directing our attention towards solving the all important question: Where are these spores during the time just before the rotting season? Next winter we may be able to tell you something more about this matter. In the meantime, we are safe in giving you this advice: Remove all the dead apples from your trees and from the ground under your trees before the buds open.

Knowing now that this disease is propagated by spores, we may ask, ought it not to be easy to fight it by spraying? to which question we may say with little fear: "Yes, we think so." The spores get into the fruit from the outside; we can destroy the spores which cause other diseases in this way, why not the "bitter rot?" We are now trying, on a large scale, in a number of orchards extending from Virginia to Oklahoma, to find out when it will prove most profitable to spray. As the disease attacks the fruit during its ripening period, I have much hope that late spraying will prove successful. I would accordingly recommend spraying trees once or twice in June, July and also in August. It may be objected that spraying so late will disfigure the fruit, or leave too much of the Bordeaux mixture on the fruit. In the first place, I do not think enough would remain to make

any material difference with the dark skinned apples grown in this State, and secondly, investigations have shown that the danger from Bordeaux mixture alone is infinitesimally small. The suggestions made here are to be considered as purely suggestions, and are not based on any experience. In a year or so I hope we may be able to give you some actual results.

For spraying we are using Bordeaux mixture, using 6 lbs. of copper sulphate and 4 to 5 lbs. of lime. Right here I wish to say a word about spraying. I had better say repeat a word about spraying, for it has been said often before. Spraying, to be of any value, must, first of all, be done thoroughly. And secondly, it must be done with a mixture properly made. Poor mixtures and careless sprayings are money and labor wasted. I cannot here go into a discussion of the reasons why we use lime and copper sulphate in the proportions indicated; suffice it to say that these proportions are fixed by chemical laws. When we say lime, we mean unslacked, fresh lime. Partially air-slacked lime is not fresh lime. If you use this partially slacked lime the amount of lime which will unite with the blue vitrol is too low, and you cannot correct it by guessing at it, and putting in a few chunks more of the lime. It cannot be said too often that the making of this mixture is a chemical process, which must be followed strictly according to directions. The blue vitriol, which may be kept as a stock solution, should be poured into one vat and diluted to the proper amount with water. The lime should be slacked in another vat and diluted to the proper amount. Then both solutions should be poured into a third vat or the spray tank simultaneously through a fine strainer, (20 wires to the inch), stirring the mixture constantly at the same time. When made according to these directions, a good mixture cannot fail to result.

In these days when we are beginning to appreciate that to know what the laws are which operate on the farm and in the orchard, every farmer and fruit-grower ought to inform himself of some of the principles underlying his work. We are often asked where this information can be found. The journals give us a good deal, but concise hand books are of the greatest value. In connection with the spraying, I always like to recommend: "The Spraying of Plants," by E. G. Lodeman, published by the Macmillan Co., New York, price \$1.00. It is a little book which every fruit-grower ought to have on his shelves. (The Western Fruit-Grower will send it, postpaid, at price named, \$1.00.—Ed.)

In the foregoing I have attempted to give you a brief outline of the facts now known about bitter rot. We really do not know very

much, but I believe that by studying the facts presented a little and following out the suggestions made as to spraying, apple-growers may find less bitter rot and more good apples this season than in years past.

We will say in this connection that at the conclusion of the reading of Prof. von Schrenk's paper, Professor Stedman was asked if an arsenite could not be added to these later sprays and catch the later broods of the codling moth, and he replied that as many could be killed then as earlier in the season. The later ones are really the ones which do the greatest damage, for they are the ones which appear in the fruit at picking time. The only reason it has not been recommended to spray late for them is that the cost would be too great. But if the grower is going to spray for the bitter rot anyway, as they will have to do in Southern Missouri and Illinois, then he can add the poison at very slight expense, and render his fruit more free from insects. He hoped many who spray for bitter rot would do this as an experiment.

Question: Are some apples immune?

Prof. Von Schrenk.—Yes, sir; I am sorry that I forgot to bring some photographs of this nature with me. We tried an experiment with some apples that were perfectly sound. We took Ben Davis ripe, perfectly sound, and we sterilized those apples until there was nothing on them. Painted them over with bitter rot. We put them away for two weeks and they were perfectly sound. When an insect hurts the apple in any way, the bitter rot has that much more work to do. But there are some varieties that take the bitter rot easier than others. It may be that there will be some kinds of fruit that we will have to give up. But don't give up raising apples on account of bitter rot. Spray for it. Spray several times; at any rate I would not feel discouraged.

Secretary Goodman.—How do you put in this blue vitriol and lime? Do you put the two together?

Prof. Von Schrenk.—The manner in which I would do this would be to build a platform on posts. Have two divisions or steps to it. One a little higher than the other. I would have two vessels, one filled with the mixture of copper sulphate and the other with the other mixture. I would have two pipes and have a vat on this lower part large enough for the contents of the two vessels. Such a thing as this can be fixed up anywhere. Not much trouble. The only thing is to get the water to the top platform. Now, if I was building one I would have this kind of a platform: I would have two cases placed on the lowest. Lime in one and copper in the other. Then I would have two pipes to these and have it so that they could both be open at once and run the two out to-

gether. It is just as easy to run the two out at once as it is to run one out at a time.

Question: You recommend the picking up of the rotten fruit; what would you advise us to do with it?

Von Schrenk.—I would remove it from the orchard. Get it as far away as possible; bury it in some ditch; cover it up with dirt.

About spraying. I would spray from now on for the bitter rot. We used to always say to spray a little before the blossom. But I believe that we will learn that the effective spraying will be in the latter part of the season and not the earlier. Yet we don't do it now. We are experimenting. We began before the buds opened. Then we have some that we are going to spray a little later, and some others that we will spray quite late and will note the effect.

Mr. Erwin.—Professor, did I understand you to say that this fungus could be in the shape of dust and could be blown about by the winds?

Answer: Yes, sir.

Mr. Erwin.—I noticed in a young orchard in the southwest corner the trees became affected first and all those that were in line of the prevailing wind. I wonder if it could be blown there from the timber.

Von Schrenk.—No; not very likely. It only affects apple trees. In fact, it only effects those fruits that have sugar in them and a good deal of starch.

C. W. Wilmeroth, Chicago.—We would like to know something of the bitter rot, for it is making a great deal of trouble for us. Last year we had a shipment of 48 or 50 barrels of apples shipped from a point in Illinois to Chicago and in going there they took the bitter rot. When we opened them up they were covered with spots of the rot and were ruined. Worth nothing. This matter causes us to keep our eyes on the Illinois bitter rot. We don't know whether it is a disease that is going to come up every year or not. We are in a quandary; we don't know what to do about it.

Von Schrenk.—I am so glad you spoke of that fact. So many cold storage men come to us and ask about that. These apples are bought and people are sent to gather them and perhaps are not very careful in picking them; at any rate, they have a chance of being bruised. When the fungus is in the best conditions, it only takes a very short time to develop. I can make them be of no account in 36 hours. Now, then, if you spray heavily several times, there comes up the question between the grower and the buyer. Now, how about the Bordeaux mixture? It will be either fruit with Bordeaux or no fruit. But are we going to send our apples to Chicago with the Bordeaux mixture?

Secretary Goodman.—Now about packing. Could we use this Bordeaux mixture inside of the barrels?

Von Schrenk.—Yes, of course, we could do that thing. But we are going to be a little slow about doing a thing of that kind. I would like to see that very thing tried. But I am not going to advise anyone to try it and then get into trouble and have him come on to me about it.

Dr. Green.—I would like to tell you of a little experiment. I was going to soak some apples in the Bordeaux mixture, baptize them in it, and then cover them with soap suds. I got a box and a friend of mine and myself selected 20 apples which were perfectly sound, took our microscopes to see that there was no bitter rot on them. We washed them perfectly clean with water. We then put them in the Bordeaux mixture and left them there ten minutes. We did all this in my cellar where there were no other apples. After we took them out of the mixture, we soaked them in soap suds. We then put them away in one end of the box and those that we had done nothing to in the other end and they all rotted alike. We had the Ben Davis and Winesap.

Question: How long did you keep them?

Dr. Green.—I kept them until sometime this spring.

Oh, well, it was their natural time to rot.

Question by a member: How about freezing apples to ship them?

C. W. Wilmeroth.—We have tried that. Take an apple that is already effected with rot and freeze it there was no signs that the rot had grown 1-16 of an inch. Of course that will stop it. Ice cars might do, as 34 degrees will stop it.

Judge Miller.—Apples can be frozen as hard as a bone and then put in a cellar and thawed out and come out all right. This is an important question.

Mr. Waters of Canton.—We are going to hold Farmers' Institutes in every county in this State this fall and I would like to meet and talk with some one from each county. I have seen a great many from a great many counties, but there are a few that I would like to meet yet.

EXPERIENCE WITH CANCKER WORM.

(By G. P. Turner, Meadville, Mo.)

The canker worm in this section has become an established fact, and unless spraying or other means be resorted to, or some unforeseen agency come to our help, the years of profitable apple growing are few. This pest first appeared here in the spring of 1896 in a 40-acre orchard adjoining the town of Meadville. No doubt the insect had been increas-

ing for several years before that time unnoticed, for that spring the worms completely defoliated a large section of the orchard as they also did the two following years. No preventive measures have been used except that the orchard was sprayed late in May of 1896. I was engaged to do that work and used London purple as recommended by Experiment Stations. Most of the worms had attained full size before treatment was begun and no beneficial results were noticed. The hard winter of 1898-99 seemed to check them, for they did but little damage the spring of 1899. They seem now to have fully recovered, for they have completely stripped the trees this season, and have a pretty good foot-hold in the surrounding orchards for several miles. I am quite sure this orchard was the starting point for the infestation of a large scope of country. There are, however, many infested orchards in this and adjoining counties that probably did not become infested by this orchard. My own orchard of 25 acres on the opposite side of town from the orchard in question has been showing increased signs of canker worms for several years. As the time had arrived when, in my judgment, something had to be done, I made preparations to begin the application of poison on the first opening of the leaf buds. Four ounces Paris green was used in 50 gallons Bordeaux mixture, being applied by means of a barrel spray pump. This treatment was begun April 25th. We began the second spraying May 10th, using this time 5 1-3 ounces green arsenoid in 50 gallons Bordeaux mixture just as the blossoms dropped. The worms did considerable damage after the first spraying and I began to doubt the efficacy of the poison, but on closer examination I found some of the dried skins of the worms that had died. After the second spraying some of the worms still remained, but by May 25th it was only by very close searching that I could find a worm. I do not say they were all poisoned, because at the last date named many of them may have already entered the ground preparatory to emerging as a moth. While I am well satisfied with the results of spraying in this experiment, I do not think it would be best to depend on this means of combatting the canker worm.

The weather this spring has been exceptionably favorable for spraying. With the exception of a few light showers there has been no rain to wash off the poison. With an excessively wet season the results might have been far different. Destroying the female moth that deposits the eggs on the tree, I believe to be a most effective way of combatting the pest. By the information sent out by our worthy State Entomologist I was enabled to identify the female moth, which is wingless, of a grayish color and varying in size between a house fly and a green fly. I discovered the insect while pruning the orchard during the mild weather of

March. I could never find more than two on any one tree, and usually only one. While removing the wooden wrappers from my young orchard I found many of the moth in hiding under the wrappers. Of course I made sure to kill every one I found, and it was very noticable when the worms hatched that the part of the orchard where I killed the moth was comparatively free from worms. Therefore, I think it expedient to trap all the moth we can, and then if the worms appear we can resort to spraying. I hope a more servicable spray pump will soon be invented. Pumps with leather valves that come in contact with the liquid render but poor service. I am using such a pump made by Myers Bros., Ashland, Ohio, and have had to renew the valves three times already this season. This is a bother and an expense. I hope the spray pump question will be fully discussed at the summer meeting. Hoping that the meeting may be a source of enjoyment and profit to all. I remain fraternally yours.

“STINGERS” WILL BE AT THEIR WORK.

(By Conrad Hartzell, St. Joseph, Mo.)

When the ripening of the fruits is realized “stingers” will be wide awake and hungry; and unless their immediate wants are otherwise supplied they will light upon the ripening fruit and live upon it. They will not stop to consult with fruit owners. They will only accept the best; they are very choice and dainty in their selections and must have the best. Only sweet flowers will induce them to leave the ripe fruit.” All stinging insects are fruit eaters when there are no flowers, no rich bloom for them, and there is very limited bloom at that season. The ripe fruit is seized upon by all the stingers. Even the valuable honey bee takes its share—wasps, hornets, bumble bees, sweat bees, jackets of all colors—all stingers go for ripe fruit when there is no bloom. Now, then, man must provide. One easy way is quite possible and entirely inexpensive; in fact, when understood it is very profitable to provide enough rich sweet bloom to fully supply all stinging insects and cause them to leave the ripe fruit to the giver of the bloom. Buckwheat bloom in sufficient quantity and near the ripe fruit is sure protection against stinging insects and is very profitable on the farm. It is one of the best land cleansers, and does not impoverish the land, but prepares for other crops. There are several varieties of buckwheat. Silver hull is the preferable kind. The last few days of June and the first few days of

July is the proper season for seeding the buckwheat. Eight quarts per acre is sufficient quantity in well-prepared land. It may be seeded in small lots to good advantage and may be made very valuable among corn where there is a too thin stand of corn for good crop. After wheat is harvested buckwheat may be grown to very good advantage. Every farmer can raise buckwheat to his very great advantage and especially to the advantage of the ripening fruits. Not simply theory, but ripe experience.

SIXTH SESSION—Thursday, 2 p. m.

Questions were the first order of the session.

What is the matter with our older Ben Davis trees?

Are affected by root rot and other fungus diseases.

Why do plums rot and fall off?

Plum rot is fungus disease and Bordeaux spraying in time may prevent it.

Cause of trees bleeding last spring? Remedy for root louse?

Probably injured by cold winter of '98-'99. Tobacco dust.

What will prevent pear blight?

Nothing yet known. All the remedies so far have proved of no value.

Varieties of peaches, hardiness, time of ripening, commercial value of each?

Mt. Rose, Reeve's Favorite, Family Favorite, Champion, Elberta, Old Mixon, Pickett's Late, Salway, Heath Cling.

Practical means of fighting insects and fungi in our orchards?

Spraying or dusting is the only sure remedy.

Grape rot?

Use Bordeaux mixture.

Who receives greatest profits, grower or shipper?

Sometimes one and sometimes the other, but usually the railroads.

Grape rot and apple black rot; remedies?

Spraying is the best remedy we know.

Should the family garden include berries and small fruits?

Yes; by all means. Use the best varieties and success is sure.

The planting of root grafts of apple and pear in orchard where they will remain?

Is a great help and will give an orchard more quickly and better if you can give close enough attention to them to secure the best growth.

Axle grease for preventing rabbits gnawing trees, what kind?

Better not use it. Better wrap the trees.

Can peach trees be grafted? If not, why not?

Yes, with tolerable success by experienced hands. Many use a bit of 2-year-old wood at the base of the scion to form the union.

Peach scab? Prevent it?

Spraying will help, but not sure. Danger of burning the foliage of peach.

Quince culture?

Use low, rich, moist soil and the best of cultivation and mulching.

How to remove the apple crop?

Pick and pack at once in barrels.

Selection of orchard sites.

Good porous subsoil more important than all else besides.

Way of knowing the value of apple crop before selling, say, September 10?

Cannot tell. All estimates and reports are only guesses as to what weather and demand will be.

Average crop of apples more profitable than same of corn, wheat, oats, hay?

Yes; much more so.

Varieties of fruits recommended by the Society for profit, for table, for experiment and the locality of party recommending them?

Society only gives individual experience.

Will it pay to set strawberries in the fall?

Yes, if weather is right and ground is in good shape. Mulch at once after planting.

Is spraying profitable to a person when others fail to spray?

Codling Moth, no. Canker Worm, yes.

Dust versus Spray?

Comparative value is not yet determined, but the prospect for good results are very favorable.

Hardy evergreens for Southwest Missouri?

Red cedar, Norway spruce, Scotch pine.

Sun scald and Woolly Aphis kill more trees than all other troubles?

The borer and root rot are equally as bad.

Can the raspberry be successfully treated for Anthracnose?

Not yet proven. Bordeaux is the best known.

Spraying or the moth catcher, which is best?

Spraying a hundred times more successful, because you can spray for diseases and canker worm at same time.

Can apples be grown successfully on ridge land where hard pan is near surface?

No; they cannot. They will bear for a while and then die.

Quality of Concord and Worden grape?

Nearly the same; should plant them both.

Why do not fruit trees live to the age they did 100 years ago?

Insects and diseases are much more prevalent now than at that time.

Cause of rot of apple trees starting below ground and working up?

Root rot is a fungus and it is not known what is the cause.

Is green aphid injurious to the bud?

Yes; often checks growth.

How get rid of Canker Worm?

Spray with 1 pound Paris green to 100 to 150 gallons of water.

Cause of fruit falling at blossom time?

Often because not fertilized. Nature provides a hundred blossoms where one fruit is wanted.

Fighting insects?

Spraying or dusting is the best plan.

Cause of all peaches dropping from 3-year-old trees?

Probably the trees are growing so rapidly that they shed the fruit, or perhaps they were not well fertilized.

Spraying?

Is the best remedy for all diseases and insects that is known. Dusting may succeed also.

Does the original strawberry plant live after fruiting?

Yes. It will bear for two and possibly three years.

Moth traps?

No value in the orchard.

Will it pay to spray an orchard when crop will not pay expenses?

It may do so to clean the orchard of pests for the future years.

How to fight the Scab and Codling Moth? Spray with Bordeaux mixture and arsenites. Spray before leaves start and three times after.

If bi-chloride is so good to kill the germ on potato scab before we plant, why wouldn't it be good for bitter rot spores? Has anyone tried it?

Prof. Von Schrenk.—Bi-chloride of mercury is too dangerous and poisonous and cannot be made to stay.

Question: Does spraying pay the average farmer?

Prof. Von Schrenk.—In answering that I would say yes, if is properly done. The way it is done by most of our farmers does not pay, but certainly, if it is done in the right way, at the right time, it will pay and does pay.

Prof. Stedman.—Spraying will pay the farmer in this way: When the insects are numerous enough, then it pays. But I wouldn't take the precaution to spray before he knows that he has harmful insects and

that they are numerous. I wouldn't advise him to spray for insects as a means of prevention. I do not think it would pay to take the time and trouble and expense to guard against getting these insects. But when you have these insects, it certainly pays to spray.

Question: Is spraying profitable when those all around you fail to spray?

Stedman.—Well, that depends entirely upon the insect.

Mr. J. J. Kiser.—Ladies and Gentlemen: I am very glad to have the opportunity of speaking to you about my machine. But before I begin, let me say that this machine is only a secondary matter with me. I have been laboring for years to keep from spraying. If I can succeed in doing away with that work, I ought to be at least a welcome visitor to you. As a machine man, I want it understood that I am here for saving labor and doing the work better, if possible. I want to say to the professor that has worked so hard and faithfully that I may be of help to the fruit grower and the fruit buyer. Now I don't write professor before my name. What I know I have got by experience. I want to help the farmers and ask for their attention to my machine. I began experimenting with a common baking-powder can. I found that it was all right, but when the first dusting process came out it was too much work. The matter came up for convenience and effectiveness. Last summer—last May—the last week in May, I dusted my orchard with several different things; but all the things contained arsenic. I did not spray because I did not think it was necessary; because I did not have anything to spray for. But last fall we were attacked with the Canker Worm. I expect several 100 trees were effected, but I believe the dusting saved them. I did not see a limb as large as my little finger that had been hurt. Now, that is a fact. Another thing is a fact. This dusting had been going on for several years. Now, if I may be permitted, I would like to say a few words about formulas. First, it is a very important matter to get this dust just the proper condition to apply. First, I get a barrel and nail a couple of cleats along the sides; then I set a kind of a sieve down in it; then I measure out ten pounds of slacked lime; it wants to be the quick lime. I find that it takes about 3 quarts of water to make it into the proper dust. I pour the water in and turn it over several times and work it up and soon it is all right. I do not let it get all piled up on the sieve. The reason I said ten pounds of lime is that I can figure easier what I am to put in. I would get me half of Bordeaux mixture for the 3 quarts. Now I put this on and when it comes out it is like this sample I have. You may look at it. This has not been ground. Now, as far as the arsenic is concerned, I have taken Mr. Goodman's formula for that. In the ten pounds of lime, one quart of water, in which 4 ounces

of arsenic has been dissolved, poured in will be right. Stir it well. It does not dissolve; it gets mixed. I double the strength of the arsenic. I put 1 pound of arsenic to 20 pounds of water.

Now I have dusted grape vines, strawberries, raspberries, blackberries, currants, gooseberries, plums, apples, quince and nearly all kinds of fruits. I cannot see that I hurt the foliage of anything whatever.

One thing more. About the kerosene emulsion for the sucking insects I use 1-2 pound of concentrated lye to 3 quarts of water and that makes a preparation so caustic that when it touches an insect of this kind, it fairly sets it a fire. Sometimes I mix sulphur with it. It is a splendid thing for this kind of work. I guess you could put snuff in it, too. Road dust and ashes can be put in. Now, I am just waiting for results. But it has been practiced for quite a number of years and the results so far as I know have been good. As a matter of fact, I think it can be fixed a great deal easier than the liquid spray. My boys think nothing of going out and dusting our apple trees. It is not hard work; just as fast as you drive along you can dust. You can dust three or four rows of trees at once. In fact, I feel a little bit like one of my boys when he told me that he would not spray all the orchards on the farm for them. Now this machine is not like working a pump handle. All you have to do is to turn the crank. It is certainly easy and effective, and so far as I know, is as effective as a liquid spray. We are all interested in getting this work down to save all the labor that we can, and I believe we can do this if we will work hand in hand and heart to heart and accomplish the very best results. I am in for the very best that there is and as far as my machine and my interests in it are concerned, you may run over that if you like, but give me the very best methods you have for the insects and fungus.

Discussion.

Prof. Stedman, do you think the dust spray as effective for insects as the liquid spray?

Prof. Stedman.—In some cases it is and some it is not. I always advise people to get both machines. The dust is easier and quicker, and many will dust when you couldn't get them to spray. But in some instances it is not as good as the liquid spray. For the Codling Moth, it is not as effective. Now, on small plants, it is better. The lime without anything else is good.

Prof. Von Schrenk.—As I have not tested the dusting machine, I dare not express myself on it. I would like for it to be tried on some trees for us. The answer that I would have to make now is somewhat like Prof. Stedman's. It is good in some cases and others it is not. If

done under the proper conditions, at the proper time, why, I have no doubt but that it would do as well as the liquid spray. But it is different with the fungus than with the insect. The conditions of the leaf must be just right.

Question: Do you think you could use the dust spray on an orchard that had not been effected and use it year after year and thus prevent the disease?

Prof. Von Schrenk.—Well, I don't know; I doubt it.

Mr. Erwin.—Is there as much danger of injuring the fruit with the dust as with the liquid?

Secretary Goodman.—No, sir; no, not as much. It is not as effective and yet I believe that there is enough value in it to use it. Last year we dusted 40 acres; seven men did the work. Dusted the 40 acres; some of it twice and some three times. I used Paris green. I believe I used 1 pound of Paris green, 1 pound of Bordeaux mixture and 10 pounds of lime and used this thoroughly. Four men dusted 40 acres in 4 hours. I believe it was profitable. We have 2,000 acres in orchard and we must do something to prevent these insects and diseases. I have said but very little yet, because I do not know the results. I asked Prof. Whitten and Prof. Stedman about it and they answered about as they did today. I would rather dust my trees three times than to spray them once. The dust will go up and form a cloud, as it were, and then settle down and almost form a covering to the tree. Furthermore, I believe that lime is one of the best insecticides that we have. I believe that lime is good for fungus and that lime and Bordeaux mixture is good for the leaf curl. It is best to dust in the evening and morning. We used to begin at 7 and dust as long as we could see.

Mr. Hazeltine—The Trap Lantern in the Orchard:

Ladies and Gentlemen—Now, I want to state in beginning that I do not claim that this machine will catch everything. I do not say that spraying is useless in some instances. You do have to spray for some things; the Canker Worm is one. Spraying is the only way for that, that you can't catch them with this machine, but you can catch the moths. I do want to say this: I have grown orchards myself for 20 years. Prof. Stedman says that I can't catch a body or Flat-headed Borer. I do not claim that at all, but the body borer is not an orchard pest with us. Now, I want to say something about the root borer, the round headed borer. Mr. Harrington tried the moth catcher, and he first said he was catching these striped insects that make tree borer or root borers. He was catching them in his traps. I looked through mine and found scarcely none at all. I had about 40 traps set in my orchard, and through them all found two. Prof. Chittenden, Assistant U. S. Entomologist, the highest au-

thority, said: The borer beetles fly at night and can be attracted by lights and caught by them in June and July. We can catch them with this moth catcher. We put this trap in our orchards and tried it and know it will catch the striped bugs and the Codling Moth. The authority of Prof. Saunders says they are attracted by lights. We do catch them in our traps. I have a number of affidavits in my pocket now of those who swear that they do catch the Codling Moth. All moths that you hatch out of worms in the apples look alike. When they are young they are bright with stripes, but fade when they get older. You catch mostly young ones in the moth catcher. I have a number of authorities on the subject of spraying; some of them admit that spraying is not sufficient for Codling Moth. They are attracted by the lights during the mating season. It is then that we catch them in the moth catcher. You can set this trap in the orchard when the next crop of moths come and you can see that the insects are the same. You will know that you are catching the Codling Moth. If you make this experiment and then catch the same insect in your trap, you will know that I am right, won't you? Just try it; hatch them from your wormy apples, then send me your statement, whether you really catch them or not. I know that I catch them; I don't guess or think anything I have hatched them and know them. I compared them with the ones that I hatched and they were the same. But the best proof is that when we can use these moth catchers in our orchard we get perfect apples.

My brother used to be prejudiced against them, made all manner of fun of me for using them. But we had orchards right along side by side. Now I don't spray at all; never had a spray in the orchard, and I have his affidavit that the most perfect apples he had were on the rows that stood next to mine. He did spray. This year he has been using the trap and not spraying at all and he has fine fruit.

Dr. Green.—Would the present be a good time to test this lantern?

Hazeltine.—No, sir; it would not. I have authority that was dated the 5th day of last June, stating that at this time the Codling Moth is in its caterpillar state and that it would not be out until the middle of this month. The middle of May has been tried and caught numbers of them. They last from a week to ten days. One man gave me his testimony that he caught over 500 plum beetles, *Curculio*, in one night.

Question: Would it be good to put it in corn fields?

Hazeltine.—Yes, sir; Prof. Stedman says so.

TRAP LANTERNS.

Prof. Stedman.—Every few years some fellow comes along with a trap lantern that will catch everything under the sun. Thirteen years ago I made a test of trap lanterns—not this one. I ran these lanterns all summer long. I made this test in New York, and ran the traps in the orchards and gardens from early spring until late in the fall. Then when I became entomologist of the Alabama station I ran another series in the same way, and finally, when I came to this State there was another trap lantern being advertised by a St. Louis party, and Mr. Hazeltine sent me one of his moth catchers.

I selected a large orchard in which to set my trap, and one that had never been sprayed; the old gentleman did not believe in spraying; did not even believe in picking up his rotten fruits. It was a regular hunting ground for an entomologist. You could find the codling moths there on every tree and by the dozens. I started my traps and kept a record of every days' catch. I also had some traps in gardens and some in corn fields.

Now bear in mind that when I say the trap will not catch all the insects that it is claimed to, I am giving this on my own actual experience. I want to read the following list that is given in the circular advertising these traps: Apple worm or Codling moth. This strange little moth is a great thing, but it is very hard to determine so not all of you know it. That is where so many people are fooled. Now I do not want you to take my word for this. Take a trap and run it for a week at the suitable time, and then send the little things you think are Codling Moths to some well known entomologist, and see what he says. Many say it catches the Codling Moth. They believe it does. They may have something that looks like a Codling Moth, when it is out of the trap, but you drop it in kerosene, and it will destroy all its characteristics, so you could not very well tell it. Now, in running five of these traps 100 nights in a badly infected orchard I caught just two Codling Moths. That is also the experience of other entomologists.

I sent out a circular letter to entomologists and got their reports. I have here a statement from one who says: "I tested the trap for Codling Moth last summer and did not catch any, nor did I catch any other well known orchard pests.

Now, then, Mr. Hazeltine has kindly consented to give you a trap lantern. Next spring at any time when you know that the Codling Moths are out, you set it, and if you catch any insects that you believe are Cod-

ling Moths, you send them to some good entomologist. They will settle it for you. I have never caught a Plum Curculio. I have never seen anyone who has. You may catch something that you think is Curculio, but it may not be. You would be surprised if you could see the kinds that I have sent to me as Plum Curculio. You cannot catch them with the trap lantern. The Apple Borer—flat and round-headed—I have never caught one of them in a trap lantern. The Tip Borer—I have never caught one of them in the trap lantern. Now and then one may possibly fall in. The Peach Borer—No one can catch a single one of these moths in the trap lantern. Fall Worm—I cannot catch any of those. Corn Worm—Catch plenty of them. Army Worm—You can catch some of these. The Giant Worm—I do not know what it is. Tomato Worm—If you mean a Boll Worm, you can. No Raspberry Slug can be caught in the trap. The Leaf Roller—You can't catch that. Canker Worm—Now how in the world are you going to catch the canker worm when the female has no wings? You can't get them in your trap. Canker Worm is out of the question. Further more the Canker Worm Moth does not come out until fall, and keeps coming out all winter. Cabbage Worm—You cannot catch the white butterfly which is the adult of the Cabbage Worms, and they are the ones that do about 99 per cent. of the damage.

There are some insects that do not fly at all by night, and yet will get up and fly to a light, and, of course, you might catch some of them.

Now in regard to the Stinging Fly—There is a puzzling question. Some little insect is stinging the skin of the apples and is doing a vast amount of harm. It has spoiled a large per cent. of what would have been first-class apples. I do not know the little insect that is doing that work. I wish I did. Now while we do not know what insect is doing this, we do know some that are not doing it. It may be you can catch these insects in your traps, but whether you do or not, test it for yourselves. But you will never get rid of them in that way.

I set out a trap lantern last night and I was really surprised to get as many insects as I did on account of the wind and rain that stormy night. The orchard was not sprayed, and I got a good many things, among them a larva that dropped from the tree. I do not know whether there were any Codling Moth in the orchard or not, but I caught none. I have four Ichneumon Flies, all males. This insect is a beneficial one, I mean by that, that it destroys injurious ones. Beneficial insects are either parasitic or predaceous. I have several Crane Flies, six of them. They look something like an enormous mosquito, but are not injurious. Then three June Bugs or May Beetles, 27 Cock Roaches, and one House Fly which flies by day. Two Clover Hay Moths which are injurious. Two

Jassids: five Reduvids, beneficial. Two Horse Flies that fly in the day time. Three Geometrids; one Dagger Moth. This completes the list that I caught last night in the trap. This is only a test of one trap one night. I wanted 100 traps for three nights and have the Department of Agriculture make the determination.

So far as I can see these traps are a disadvantage in an orchard, but good for the places that I have mentioned. These matters will not be settled here. We cannot prove anything by talking, we must make the test. Let us meet at Springfield when the Codling Moth is flying at its best (as determined by Mr. Hazeltine) and make the experiment there. Have some other uninterested entomologist come who knows the Codling Moth, and have it tested fairly. Do not think that I wish to run down any trap. I want to advise what is best for the agriculturists and the horticulturists, and when we see that the trap lantern is good for a certain place let us put it there, and when we find that it is not only of no value, but an actual detriment in other places, let us say so.

THE MOTH TRAP.

I have taken pains to get all the information possible on this subject so that there need be no further question as to its failure. Facts are what we want, and when our best scientists give us such an abundance of proof for their statements we should believe their conclusions.

There seems to be no end to the proof here given that "for the orchardist or fruit grower, the moth traps are not only worthless, but really a detriment."

We ought to learn from the experience of others and profit by it, and not go to the expense of all these experiments ourselves. I have given the names and words of our best entomologists, and the refutation of those who have either been misquoted or only partially quoted.

We are sure that "moth traps" will not catch Codling Moth, Curculios, Gougers, Flat or Round-headed Borers, Peach Borers, Canker Worm Moth, and that they can never take the place of spraying.

It is a waste of money to buy these "traps," and you should be convinced by the following list of names and experiments.

L. A. GOODMAN.

MISSOURI EXPERIMENT STATION.

(From J. M. Stedman, Entomologist, Columbia, Mo.)

I give facts as derived purely from scientifically conducted experiments and accurate determinations of the captured insects, and I now feel that I have done my duty in the matter. I pronounce, as all other competent entomologists do, that all and any trap lanterns of whatever pattern using lights as the attractive agent are "humbugs" when used in orchards and do more harm there than good, on account of the Ich-nuemon flies ("stinging fly or wasp-like insect") which they kill. I had five trap lanterns (one of them being Haseltine's Moth Catcher) in an orchard that was badly infested with codling moths, and kept them going for one hundred (100) consecutive nights, beginning when the trees bloomed out, and as a result of all this, I caught only two codling moths. Is not this a low number of accidents, even? Would not one hundred have been low?

To those trap-lantern agitators and a few orchardists, who claim codling moths are attracted to light and caught in trap lanterns, I would ask: Is it not a little strange that they who are not entomologists catch these codling moths, while entomologists all fail? It seems to me the secret of the whole trouble lies in the mistaken identity of the codling moth, since there are a great number of similar looking but harmless moths that are caught by these traps.

Our experiments prove that for the bulk of the injurious insects, especially in orchards, the traps are not only of no use, but are an actual detriment. We emphatically advise the public not to rely upon moth catchers to take the place of spraying.

We wish now to impress upon the people the fact that these moth catchers absolutely will not catch—except now and then one by mere accident—the following common injurious insects, which the advocates of the moth catchers claim are caught: The Codling Moth; Colorado potato beetle; Plum Curculio; Gougers; Flat and Round-headed apple-tree borers; Peach-tree borers; Tomato-worm moth; Squash Bugs; Canker Worm moth; Cabbage butterfly, adult of the common cabbage worm; Bud-worm moth; "Grape vine moth;" "Current moth;" "Slug moth;" Strawberry root-borer.

In using the traps for the insects just named, and for thousands of other injurious insects that we have not named, one not only does no good, but actually does a great amount of harm; in the first place

by failing to catch the insects wanted, and in the second place, by killing immense numbers of Ichneumon flies and other beneficial parasitic and predaceous insects. Hence, for the various reasons given, the indiscriminate and ready use of moth catchers renders them unsafe, and it is for these reasons that trap lanterns of all kinds have justly been called "humbugs." In all our experiments in orchards with these moth catchers, we have captured only two Codling Moths and one Round-headed apple-tree borer; we have taken no Peach-tree borers, no Flat-headed borers, and, with the exception of the Tent-Caterpillar and Fruit Leaf Roller, none of the other common injurious orchard insects.

We recommend the traps for what little they are useful for, and condemn them for the harm they will do and for the danger connected with their use. We condemn the false and deceptive methods, statements and misquotations that are being used to further the sales of the moth catchers. We approve of the action of many agricultural and horticultural papers in refusing to advertise the moth catchers just so long as these erroneous claims are made for them.

Taken as a whole then, the use of moth catchers by the general public will do more harm than good.

Miss M. E. Murtfeldt, Entomologist, Kirkwood, Mo.

I have had numerous letters asking my opinion of the Haseltine Moth Catcher, its efficacy, especially for Codling Moth and Curculio, and was obliged to return what I felt would be very disappointing answers; but I could not conscientiously confirm the hopes of the writers that this trap would obviate the burden of spraying.

I have not published anything concerning its destruction of valuable parasitic flies, but that is one of the chief objections to its use.

The Rural World sent the collection of insects received from Mr. Denny to Miss Mary E. Murtfeldt, one of the best entomological authorities. She reports as follows:

"There were not only not Codling Moths, but not even any of the small species usually so much attracted to light, and which by the uninitiated are so often mistaken for the Codling Moth. There were no Curculios of any species. The capture of the apple tree pruner and the cricket is somewhat unusual. The list is quite evenly balanced between the "good" and "bad" species.

"MARY E. MURTFELDT."

From F. H. Speakman, Neosho, Mo.

In our experiments last season we used nearly a barrel of kerosene oil and caught a wonderful variety of insects and large numbers of them; in short, I think we got almost everything but what we were after. I sent samples of insects caught to Miss Murtfeldt of Kirkwood, Mo., but she could not find a single Codling Moth or Curculio.

Inasmuch as these two pests were the things that caused us to make the experiments, I for one pronounce insect catching by means of lights to save our apples, peaches and plums, a decidedly dismal failure.

Even were it possible and practicable to catch the insects, everything in fact that the energetic moth catcher introducer can possibly claim, what is to be done with the spores of apple scab, and bitter rot fungus which are also present with us?

Respectfully yours,

F. H. SPEAKMAN.

Professor E. P. Felt, State Entomologist of New York, says:

"I wish to state that money invested in trap-lanterns of various forms, including those which have attractive sweets or other fluids, phosphorescent paints and the like, apparently to make them more effective, is a good investment only in a very few special cases, and before buying them the advice of an entomologist should always be sought.

"Expensive experiments conducted at Cornell University have shown that the trap-lantern can not be recommended as a practical means of controlling many insect pests. Beneficial as well as injurious insects are captured, and some pests, like the codling moth, are taken in very small numbers. Farmers are, therefore, advised to go very slow in buying trap-lanterns."

The following is from a letter dated May 2, 1901, received from Prof. Garman, State Entomologist of Kentucky and Professor of Entomology in the Agricultural College and Experiment Station: "I tested the Haseltine trap last summer for codling moth, but did not catch one, or did I catch any of the well known pests."

Ithaca, N. Y., April 22, 1901.

Dear Stedman—You will find in the Rural New Yorker an article I wrote about moth traps, especially Haseltine's. I condemn it as strongly as you.

M. V. SLINGERLAND,

Assistant Professor of Economic Entomology.

Professor Slingerland of the Cornell Experiment Station has done more work on the codling moth than any other living person, and naturally his results should attract first attention. He has published his results in Bulletin No. 142, entitled "The Codling Moth," and on page 35 of this bulletin he says: "Unlike any other moths, the Codling Moth is not attracted to lights. This has been demonstrated several times by careful experiments with trap lanterns in orchards."

Prof. E. A. Popenoe, of Kansas, Entomologist, says: "Moth traps" in orchards are entirely useless."

Prof. S. A. Hoover, Warrensburg Normal, says: "I have never recommended Mr. Haseltine's trap lantern for any purpose whatever. I have tried it but little, and my trial was not favorable to the lantern for catching the Codling Moth. I do not endorse the lantern.

S. A. HOOVER, Dec. 19, 1901.

I have had one of these traps going in our orchard since the blossoms fell, and while we have caught plenty of May beetles and noctuidæ—mostly Cut Worms—I have failed to find a Plum Curculio or a Codling Moth.

Very truly yours,

PROF. J. TROOP.

The Nebraska Entomologist, Mr. S. Bruner, says: "The moth traps have no value to the orchardist."

Prof. Smith, of New Jersey Agricultural College, says of the New Jersey man: "He has been told better again and again, and if he will not learn except by experience, the best thing for him is to get that experience and get it over with."

Experiment, Ga., April 22, 1901.

Prof. J. M. Stedman, Columbia, Mo.:

Your letter of April 19th is at hand.

I am very glad to learn of your position in regard to the Haseltine moth trap. It is unnecessary for me to say that I indorse entirely your sentiments about this affair. I would also state that Mr. Haseltine has used me in about the same way that he has you; that is, he has quoted only a part of the letter I wrote him, and has omitted to insert in his advertising matter my opinion of such traps in general.

Yours very truly,

A. L. QUAINANCE.

Prof. F. M. Webster, of Ohio Agricultural Experiment Station, says: "I have known all along that this thing was a fraud, and all the letters I have received relating to it have gone into the waste basket."

Prof. H. E. Summers, of Iowa Agricultural College, says: "I very much hope we can stop the use of the Haseltine moth trap for codling moth."

Newark, Del., January 2, 1902.

Mr. L. A. Goodman:

On August 5, about 9 p. m., I let out a Codling Moth in my sitting room. It flew to a large Rochester lamp as I let it out within four or five feet of the lamp, circled around the lamp once and flew to another part of the room. It did not return to the lamp that evening. Now a Cutworm moth, or any moth which is attracted to lights, as every one has observed, will not only be attracted by a light, but will come back to it again and again. On August 7 I let out twelve moths, fifty or sixty feet from the Haseltine trap light as on August 5, three plum trees intervening between the point and the light. I found but one Codling Moth in the pan the next morning, and that one I observed to fly to the light within a couple of minutes after it was released. On another evening I let out a half dozen moths about fifty feet from a light and failed to catch any.

These experiments prove to my mind quite definitely that Codling Moths are only attracted to light at a distance of ten to twenty feet, that then attracted to it only when suddenly released and unused to the light, as those which I note flew to the light at once were not subsequently attracted to it.

Therefore, I am decidedly of the opinion that such trap lights would fail to catch any considerable number of Codling Moths unless placed so close together in an orchard as to make it entirely too expensive.

I am more convinced of the futility of the use of these lights by spraying experiments conducted by me this season in which 90 per cent. of the whole seasons crop, and 96 per cent. of the picked fruit was perfect fruit. Surely trap lights can not give such results.

Very truly yours,

E. DWIGHT SANDERSON,

Entomologist.

Prof. Forbes, State Entomologist of Illinois, and Entomologist of the Experiment Station, and Professor of Entomology in the Agricultural College, says: "I have received several inquiries concerning the Haseltine moth catcher, accompanied by their ludicrously ignorant circular;" and Prof. Slingerland, Entomologist to the Cornell University Experiment Station, in his article on the moth catcher in the Rural New Yorker for January 19th, says: "Most of the claims made for this new moth catcher or trap in the advertising circulars are pre-

posterous; and the use of such terms as 'stinging fly,' 'borer fly,' and others shows that the inventor is not familiar with the insects which infest orchards and other crops."

Dr. L. O. Howard, U. S. Entomologist, Washington, D. C., says: "I have no hesitation in saying that the trap lantern methods—Haseltine's and all the rest—are failures as remedies for codling moth. I am very glad that you are giving the facts about the moth traps."

It would seem that the above statements made by the best informed men of our country should be enough to convince any person wanting to know the truth about this matter.

I have brought this to your notice so that there could be no further controversy or question of the facts, and now the only thing to do is to let the people of our State know the facts in the case.

L. A. GOODMAN, Secretary.

SUGGESTIONS ON PEACH GROWING.

(By W. R. Wilkinson, St. Louis, Mo., Pres. State Board of Agriculture.)

The peach requires high, well drained, moderately fertile soil. My experience in growing this delicious fruit has been limited to Southeast Missouri, on high land on the west banks of the Mississippi river, and I consider this locality splendidly adapted, both as to soil and climate. This soil when first cleared, has few inches of rich loam, underlaid with yellow sub-soil, and containing enough iron to give splendid color to the fruit. The Mississippi river running near by equalizes the temperature and often keeps off the late frost that kills the swollen buds in less favored localities, and the valley that puts into the river at right angles gives splendid air drainage, which is of as much importance as soil drainage in the growing of this fruit; of course, there are many other places in Missouri where peaches can, and are grown to perfection; in fact, the whole southern part of the State is considered good peach land, but the section lying along the Mississippi and Missouri rivers is an ideal peach country. I prefer Missouri grown trees one year old from bud, and know of no better nursery than the one situated right here in New Haven, Mo. I have bought thousands of trees from them, and have always found their output true to name, and good trees in every respect.

Without proceeding further, I would warn Missouri planters from buying trees from the East, and especially from some of the wholesale nurseries of Tennessee. I bought largely from one of these nurseries and have peaches in the same row, all supposed to be the same variety that

ripen their fruit from July to October. It is desirable in a commercial orchard to have same varieties planted together so as not to be compelled to go all over the orchard at gathering time. I began by planting the earliest on east side, rows running north and south clear across the orchard and finished on the west side with the latest ripening varieties. I prefer spring planting for the peach. If planted in the fall there is some danger of winter killing, which can be avoided if planted in early spring. I have practiced planting on new cleared land and mostly between apple rows, and I expect to cut out peach trees at ten or twelve years old.

Before planting prepare land by a thorough plowing, and if ground is not too rough lay off both ways with a shovel or bull tongue plow in rows 16-2 feet apart both ways, or 160 trees to the acre and plant at the check same as corn or other crops are planted. If land is very rough and hilly stakes will have to be used, driving a stake where each tree is wanted. Dig hole with spade, making them large enough to accommodate roots without cramping. Remove all side branches, cut the top back to thirty inches high, and cultivate at regular intervals until July first. Then drill cow peas in rows thirty inches apart, and cultivate cow peas at least twice during July and August with some implement or cultivator that will not ridge land too much. This will give a very strong growth the first year and leave a heavy cover of pea vines on land that will prevent washing off the soil during the winter months, and add both humus and fertility to the soil. Continue this cultivation right along for three seasons, and the fourth year trees should begin to bear liberally. I would then advise different culture; instead of cultivating until July and plant to peas, I would plant land, say, 1st to the 15th of May to New Era cow peas, among earlier and medium ripening trees, and would plant Whippoorwill peas in among later ripening varieties, and hog all off when peas and peaches are both ripe. The New Era cow peas will mature by August, and the Whippoorwill by September. This will give an abundance of good feed for hogs, and destroy the insects that infest the orchard, and will secure a good profit on both hogs and fruit, the peaches and peas both being splendid hog feed. I like peach trees headed about two feet high and form the head by letting five limbs grow from the main stalk, then do but little pruning afterward; these limbs should be equally distributed around the trunk of the tree and will form a well balanced open-topped tree.

As to variety for family use, I would plant so as to have a succession from earliest to latest, and for such an orchard of 100 trees would plant the following varieties ripening in regular rotation from earliest to latest: Two Sneed, two Triumph, two Alexander, two St. John, two Mountain Rose, five Family Favorite, 10 Elberta, 10 O. M. Free, 10 Crawford

Late, 10 Piquett's Late, 25 Heath Cling, and 10 Salway. Plant the earliest ripening varieties on highest land, as they ripen their fruit at a time when season is usually wet and don't seem to rot and mildew so badly if planted on high land. For market would plant nothing earlier than Family Favorite, and would suggest eliminating Sneed, Triumph, Alexander, St. John and Mountain Rose, and plant such varieties as named above from Family Favorite to Salway, but would have at least 25 per cent of white Heath Cling. They are as standard as the Ben Davis apple, and ripen when weather is cool and will carry well to any market, and are always in demand at from \$1 to \$2 per bushel. It will be noticed that varieties named are both white and yellow fleshed, but mostly free-stones. The market demands these, there being but little call for clings, until late in the season, when the Heath will fill this demand. Should growers decide on more of the cling type, I would suggest O. M. cling and Lemon cling as among the best. I am now growing a trial or test orchard, and have Heath Cling and other late maturing varieties from nearly all the reliable nurseries, and expect to develop a superior Heath Cling that will exactly fill the wants of both grower and consumer. This variety is said to grow true to name from seed, and I suspect many of the nurseries are growing them in this way and filling their orders without budding, any way this variety has deteriorated both as to size and quality. There are also a great many varieties grown and advertised by nurseries as improved Heath, such as Miller Cling, Wilkins, Ringold, Mammoth Cling, etc., but none are equal to the old Heath Cling grown in Perry county thirty years ago, and known there as the English peach. There are also many so-called improved Crawfords, such as Susquehanna, Chair's Choice, Wheatland, etc. None I know of are better than the old Crawford of thirty years ago. All are shy bearers and ripen at a time when the weather is very warm, and rot badly in transit when shipped.

It is very important that peaches be thinned for best results, as most varieties over bear. Thin to four to six inches apart on the limbs. If you do not have time to go over carefully and thin by hand, as it should be done, take a pole and shake off; this will scar and bruise the limbs somewhat, but it is better than overloaded, broken down trees, with half grown peaches, that are not salable in any market. The pole should have a hook on the end and well padded with cloth or other soft material, to prevent scaring the limbs. The thinning should be done about the time the seed begins to harden. When fruit begins to ripen, the trees should be gone over about twice, gathering only nearly ripe, high colored fruit for market. I like the climax one-third bushel basket with wooden cover best for packing, and this should be carefully, neatly and honestly done. Pack nothing to sell to others, but such as you would have others pack and sell to you.

PEACH PRUNING.

Crystal City, April 24, 1901.

Mr. L. A. Goodman, Kansas City, Mo.:

As to peach trees, after the big freeze of winter '98, both you and S. Miller said deborn your peach trees. I had about 200 3-year-old Elberts, very nice trees. To do it was worse than pulling teeth, but I did it, and afterwards I thought that was a big mistake, for I left a few branches on each tree, and would have had some peaches last season; but the young shoots made such rapid growth they did not ripen the first buds, and my neighbors had a good crop and laughed at me for raising fruit by books; but today things look differently. I have the nicest trees any man would wish to see, whilst theirs look nearly dead.

E. WILLIAMS.

VARIETIES OF PEACHES.

(By H. W. Jenkins, Boonville.)

The writer makes no claims of being a peach expert, and his experience in peach-growing has been only confined to a limited number of varieties, so he will in this paper speak only of varieties of which he has personal knowledge, gained by actual experience.

The selection of varieties of any kind of fruit to plant is an important one that should be carefully considered by all planters, either for the family orchard or the commercial one. This is true of peaches as well as apples or any other standard fruits. The varieties of peaches have so multiplied and increased in the last few years that it has become a perplexing question for the average planter. To make a satisfactory selection a safe rule to be guided by in selecting varieties, either for family use or the commercial orchard, is to stick to the old time tried varieties first, and experiment with the new ones in a small way. When you have a good variety do not cast it aside for something new; however, extraordinary the claims may be that the introducer may make for it. In regard to the hardness of varieties my experience is this, that when the season suits, and we have a peach crop, nearly all varieties do well, and when the year of failure comes, whatever the cause may be, nearly all come down together. Occasionally a tree or variety may prove slightly better than others,

yet the superiority is so small that you cannot depend upon it for a crop, and these so-called Iron Clads in bud generally prove no better than their brethren. The All-wise Creator, when He made man, gave him a variety of tastes, and He also, for to meet these different tastes and appetites, created also a variety of peaches—some white-fleshed, some yellow, some cling and some free stones, so that this matter of taste, or, rather, the peach which satisfies the appetite best, is one that can only be solved by the individual who consumes the fruit. In my list of varieties to plant I shall include some of the best known varieties, both yellow and white, cling and free stones, and think they will be sufficient to meet the requirements of the ordinary planter. Plant very few very early peaches, either for home use or market; they are disappointments, both in quality and keeping, nearly all generally being easy to decay and rot—all watery and insipid at that. For family use I would plant a few trees only. For July ripening Sneed, Amsden and Alexander; for August ripening, Foster, Champion, Crosby and Elberta; for September peaches plant O. M. Cling, Miller Cling, Stump the World, Heath Cling, and Smack; for October plant Salway. This list will give a succession of peaches from middle of July to middle of October, a period of three months, which about covers the peach season along the Missouri river. For a commercial orchard I would cut the list down to Champion, Elberta, Stump the World, Miller Cling, Heath Cling and Salway. Now some of my fellow fruit growers may ask, well how about the Dewey Cling? you have left it out of the list. Yes that is a fact and for this reason, I lost the original tree the summer of '99, either from the preceding hard winter or the severe dehorning that I gave it in the spring, it died anyway in August, and as yet I have never seen a matured peach grown on younger trees. But now have a number of young trees that have on their first crop, and at this writing look as promising as could be expected under the drouthy conditions of the weather, no rain having fallen since April 16th. If these mature and compare favorably with the fruit which grew on the original tree and I can succeed in winning a medal at Buffalo as I did at Omaha in '98, then I shall not hesitate to place it where the Heath Cling now stands, as the most valuable white coming peach of the day, and my confidence in it to supercede that old variety, will not be shaken until it proves its self inferior by actual comparison.

LIST OF VARIETIES OF PEACH.

Major Holsinger of Rosedale, Kan.—“This is a list that I would suggest to take you through the entire season: Sneed, Triumph, Family Favorite, Salway and Champion.”

President Murray of Oregon, Mo.—“I would give Champion, Elberta and Crosby.”

W. A. Gardner of West Plains, Mo.—“Nothing better than the Elberta for early fruit. I should say the Elberta, Matthew Beauty, Crosby and Salway.”

Mr. Erwin.—“I would suggest Heath Cling and Elberta in southern Callaway.”

Judge Miller of Bluffton, Mo.—Crosby, Elberta and Heath Cling.”

D. A. Robnett of Columbia, Mo.—“I believe I would give Mountain Rose and Elberta.”

Mr. Evans.—“The list to make money out of for almost every part of the State would be Mountain Rose, Stevens' Late.”

Prof. Dutcher of Warrensburg, Mo.—“The Elberta is about the only thing we raise in our part of the State for market. But my trees are nearly all Crosby.”

Delegate from Cole county, Mo.—“I would give the Elberta, Salway and Crawford's Late.”

Delegate from Osage county, Mo.—“The Alexander, Heath Cling and the Champion and Salway.”

Jacob Faith of Nevada, Mo.—“Mountain Rose, Champion, Elberta and Salway.”

Dr. Green of Chillicothe, Mo.—“Champion, Crosby and Chinese Cling. Chinese Cling is the only one that did not rot on the tree last year.”

Mr. Nelson of Lebanon, Mo.—“Mountain Rose, Salway.”

Short Discussion on the Peach.

Holsinger.—The Crosby did not do well at all with me. It is not good shaped and in fact I do not know what was the matter with it. Now the list of varieties that I gave are those that bear from the earliest to the latest.”

W. A. Gardner.—I would like to just make a few observations regarding the freeze of '99. I did not cut back my trees. The reason I did not was this: The bark was not frozen on the main branches. I believe there is force in the bark that is needed to develop sap for the tree.

Major Holsinger.—I have had some experience along this line. After the freeze I did not know what was best to do, so I cut some back and some I did not. Now, I found that some varieties could stand the cutting back and others could not. The Champion all lived, but of the late October about one-half died; so with some others. It seems to me that there is considerable difference in regard to the varieties. Of the

Elbertas I cut back some are living and some are not. I noticed another thing. Those that were planted on low ground were killed, while those on high ground were not. But I want to say that the Sneed stood it fine. I have a fine stand of them, the finest I ever saw of any peach.

Mr. Erwin.—I believe that the ground has something to do with the life of the tree. I had 1,000 trees of 4 and 5 years of age. On the south slope, when you would cut in the limbs of the trees, you would find that they were dead; on the north slope the trees all lived and they were of the same varieties as those on the south slope. I also found that there was a great deal more damage done with trees that stood about 50 feet above the level of the river than those on a high ridge. I did not lose any trees at all there in trimming, however, I did not trim as much as I did on the low ground.

Mr. Evans.—I want to say a word for the benefit of those who might intend to plant a commercial orchard. A great many varieties have been named here. Now, there are a great many people who do not know one variety from another. We never know anything until we learn. But I want to say there is not a peach that I have not tested that has been mentioned here. Susquehanna, Wheatland, Matthew's Beauty, Early Crawford and a number of others that I might name. All these are safe to plant in commercial orchards, but some are inclined to be shy bearers. The list that you want is the list to make money out of. We have been pleased when we have a list that runs from July to October. That list will also make a good family orchard. We have nearly all varieties; they are nice to have. We have some Susquehanna now and they are looking nicely.

Mr. Lamm of Sedalia.—How do you trim your peach trees, Mr. Evans? Open head? My instructions have always been to keep them back. Now, what head is the best?

Mr. Evans.—I did not rise to say a word about pruning. But I will say this: For three days after the snap of '99, I was confined to my room, but I at once began to write out to agricultural and fruit papers and give the people instructions about their peach trees. I knew what had happened. And I want to say right here that I will not take back a single word that I said then. I believe you should begin to trim your trees when you plant them. Make whips and not more than two feet high. Don't plant too big. Cut them back to about 2 feet and make whips of them. Cut from 1-3 to 1-2 of the third year back. Whatever you do, keep them down. Head them back. Keep them so you can stand on the ground and pick your peaches from the trees.

(Remarks from Dr. Green from Chillicothe about mulching and

watering trees and even getting fine peaches from seedlings. Mr. Evans replied that it would not be profitable or possible to tend 500 acres in this way.)

HOW TO START THE APPLE TREE.

(By Jacob Faith of Montevallo, Vernon County, Mo.)

Many years' experience and observation have lead me to the conclusion to start an apple orchard to grow and bear successfully, select apple seed from the large uniform, well matured fruit from long lived, hardy, vigorous growing varieties. For summer and fall sorts I prefer the seed from Red Astrachan, as this is a vigorous growing tree and long lived. For winter varieties also plant seed from large, vigorous growing trees such as Minkler, Red Romanite and other long lived, vigorous growers. I am sorry to see that the most apple seedling roots come from the cider mills—from knotty, immature, wormy, wind fallen culls.

Much is printed about whole apple tree roots, and scions grafted on whole seedling roots. If the seedling root has such influence on the long life as is claimed, why not the seed have the same effect? Why propagate from poor seed? Another great mistake is to use scions from trees of poor, irregular bearing qualities. Often scions are cut from nursery trees and winter sprouts. Then we wonder what is the reason trees don't bear and why trees are so short lived. Scions for grafting and budding should be selected from the best, most uniform bearing trees. This can be done by watching a few years' fruiting. I emphatically object to taking scions for grafting from nursery stock or winter sprouts.

In breeding raising stock we select the best. See the success and advancement made in hogs and other stock the past 30 or 40 years. The same is true of the many new and better varieties of fruits, but are we not falling short in long lived, regular bearing trees? I claim the low prices have driven the nurserymen to grow short lived, unproductive trees. The low prices have driven me out of the business. A few years ago I walked through a nursery in which there was a row about six years old that looked like a wilderness. The proprietor said that he used this row to cut scions for grafting. I remarked that it was a poor way to propagate trees to bear. He agreed with me that it was, but said he grew trees to sell for the money there was in it, and that water sprouts and nursery trees made the straightest nursery

trees; that the buyer always picked out the straightest, nicest looking trees, and that the prices were so low he could not afford to select seed as it should be, or scions from good bearing trees, etc.

All short lived, tender sorts should be either budded or grafted about three inches above the crown or collar of whole roots; roots about six inches in length. These roots are more apt to throw up water sprouts than piece roots, and water sprouts must be pulled off. In case the scion or graft should fail to grow, let one sprout grow which can be budded or grafted next year. Vigorous growing varieties adapted for the soil and climate if grafted on piece roots will soon be supported by their own roots. It may seem a big job to get seed, but one bushel of apples will make hundreds of seeds. Wash or separate seed from pomace, for if left in the pulp will mold; mix with alternating layers of sand in boxes. It is best to keep them in dark. When cold weather comes keep them where they will freeze and thaw until early spring, then sow; plant out in nursery beds in rich, well pulverized ground, well cultivated and kept clean of weeds they grow large enough the first season to graft, the following summer to bud. The above will also apply to stone fruit—peach, plum, cherry, etc.

Age to Plant.

I prefer planting 2-year-olds, which can be trimmed to grow as desired. I prefer low heads. If started right, very little pruning is required. Cultivated crops should be planted in a young orchard. I prefer first cow-peas, tobacco, castor beans; such act as fertilizers and benefit the trees, and neither need late cultivation. Potatoes often are dug when trees should have no more cultivation. Small grain—wheat, oats and millet—should not be sown in an orchard. Clover may be sown after trees are six or seven years old. Poultry has been beneficial in my orchard, especially to plum trees; pigs are also beneficial in an orchard, after the trees are seven years old, provided they are rung to keep them from rooting holes, and no water pond in the orchard.

Washing trees with a suitable wash made of about 5 gallons of soft water (old soapsuds, where clothes have been washed, are best), add about one-half gallon of soft soap, one pint of crude carbolic acid and two pounds of sulphur, in late spring is very beneficial to keep back moth and insects.

Fertilization.

Some varieties are shy bearers if planted by themselves and are benefited from the pollen from other varieties. I would not plant more than three or four rows deep. I would prefer planting

in rows running north and south 32 feet, and east and west 16 feet. When trees five or six years old, I girdle and summer prune the middle trees, which causes them to form fruit buds, and in a few years exhaust themselves in heavy bearing, and then be cut out to give room for the standard trees 32 feet each way. Girdling means simply cutting out a strip of bark about one inch wide entirely around the trunk, about one foot above the ground, cutting down to the sap wood; the wound soon heals over. Do not understand that I recommend girdling; only trees that we aim to be cut out in a few years. Girdling has to be done when the bark peels, as soon as the leaves are full grown. Young trees do best when planted close, but old trees need space.

Varieties to be planted, as my paper is getting long, I will say look and see what varieties do best on soil like yours.

DISTRIBUTION OF APPLE CROP.

(J. S. Atwood, Carrollton, Mo.)

The greatest problem that faces the fruit grower of today lies not in the growing, but the final disposition of his crop. There was a time when the buyer ranged the country in search of fruit and was glad to pay well for it, while the grower stayed at home and commanded, or at least, thought he commanded, his own price. But the last decade has ushered in a new order of things for the fruit grower in Missouri and the middle west. A large acreage has been planted and is now in bearing; rapid strides have been made in methods of cultivation, and the largely increased output demands a revolution in the methods of disposal. These facts are of especial importance to the apple grower, and to him the situation is one of more than ordinary gravity. Some seasons the apple crop in the west is enormous and of good quality. Buyers take only the choicest orchards, prices are low, and then it is really a debatable question whether the grower, although he has mastered the art of cultivation and brought his fruit to perfection, will realize the cost of picking, packing and placing on the market.

Such a condition of affairs should never exist, and the only preventive lies in a proper distribution of the crop. With our modern facilities for cold storage, which practically allows a solid year for disposing of the season's crop, there is absolutely no reason why every apple should not be sold and that, too, at a remunerative price. In this great land of ours the consumption of fruit has become universal, and with the apple

a necessary food product, as it is now generally recognized, the demand on this continent alone is sufficient to satisfy the most exacting, and when we look over the large export trade and consider the demands abroad for American apples the cry of "over-production," so alarming at first, sounds faint when it is actually tried before the great law of supply and demand. The great difficulty does not lie in over-production, but in unwise distribution.

It is in the field of distribution that the apple grower's business judgment is taxed to the utmost. Even after the crop sets and begins to show up well on the tree no man can say with absolute assurance whether he should sell on the tree in July, by the barrel in September or pick, pack, place in cold storage and wait for better prices.

In this section the commonest way of disposing of the crop is to sell on the tree, either by the barrel or in the lump, a month or two before the season of ripening. This method has some very evident advantages. It relieves the grower of all worry and responsibility attending picking and packing, and offers ready pay for the season's work. But in such sales the crop is nearly always underestimated and the prevailing prices at picking time are usually much to the advantage of the buyer. At best this manner of selling can allow the grower only an approximate value for his crop and is a rather crude way of trying to realize its worth.

A better way, if good business sagacity is exercised, is to hold the crop until maturity and then sell by the barrel on the tree, or pick, pack and prepare for market on one's own responsibility. The latter method is the only one that brings the grower face to face with the question of distribution, and if energetically and intelligently carried out, is without doubt the most profitable in the long run. The grower then receives full advantage of whatever rise in price the advancing season may bring, and he is not forced to place his entire crop on one market or dispose of the whole at one price. The first question that faces the man who expects to hold and distribute his own crop relates to the matter of storing. As a rule, the ordinary grower has no storage of his own adequate to keeping apples through the entire selling season. In such a case the only thing left for him to do is to place his crop in the nearest reliable cold storage establishment. The following months are spent in closely observing the markets and carefully settling upon points of most profitable disposal. There are no localities that are always marked by a surpassing demand for apples; the strongest demand flits about from place to place with the scarcity of crop, and with our varied means of transportation this demand is soon equalized so that a short crop in a certain section does not necessarily mean a strong market. All the exigencies that attend the law of supply and demand must be met, and the great

requisite for success is sound business judgment. Unfortunately, this gift is not bestowed upon all men, nor is it always found in the same degree. Hence the individual efforts of the grower to distribute his crop profitably very often meet with failure.

So much for the isolated attempt of the individual, and this leads us to touch upon some of the benefits that may accrue from honest co-operation. We are living in an age of combination and united effort along all lines of production, and co-operation in the proper distribution of fruit is by no means a novel idea. With small and more perishable fruits the plan has been tried with some degree of success. Its entire success, of course, depends upon thorough organization and harmonious operation in every detail. A method which is successful in the distribution of one kind of fruit may be successfully applied in its essential features to the distribution of all kinds of fruit, and there seems to be no good reason why the co-operative system cannot be carried out in the distribution of the apple crop. In many cases the expense of cold storage would be obviated by selling on the track at a remunerative price, and glutted markets, which inevitably follow random shipments, might be prevented to a large extent. The grower's product is less likely to fall into the hands of unscrupulous commission men, and a higher shipping grade can be maintained.

Under the present conditions, however, the most profitable way for the grower to dispose of his apple crop is often a combination of several of the plans above suggested. For instance, prices for fancy grades sometimes range high enough at picking time to justify a sale in the orchard or f. o. b. at station. In this case the inferior grades and culls can be distributed by the grower in local markets. However, it more often occurs that prices even for fancy apples run low in September, and the grower, rather than sacrifice his crop, prefers to place his best stock in cold storage and await later prices. After all from the grower's standpoint the aim of distribution is to get the most out of the crop, and until some system of united effort is introduced the individual's success must depend upon his energy and good judgment.

ORCHARD ON THE CONTRACT PLAN.

(By H. S. Wayman, Alvord, Mo.)

Our usual plan for putting out orchards on what we term the contract plan is as follows:

We, representing first party, furnish to second party the trees, in lots of not less than 1,000, and direct the planting, culture and care of the

orchard, which is done in a manner prescribed as customary with commercial orchardist, on contract to take one crop of fruit for pay, having our selection of crops, each of which is held at our option till gathering time until our selection is made.

Second party plants, cultivates and cares for the orchard as above described and is liable for any loss resulting from his carelessness or neglect: said loss not to exceed our regular list price of such trees with 6 per cent. interest from date of contract. Second party may buy this contract at any time, if he so elects, by paying our list price for the trees at 6 per cent. interest. We have contracts on other plans, but thus far they have proved not so satisfactory or practical and I will not occupy your time here in their discussion.

A favorite plan with some of the tree sellers who have visited this section of country is to furnish the trees, tell how to plant them and so on, on contract to take one-half the pay in cash and one crop of fruit for the other half; usually the second or third crop from time of setting the orchard, and then usually skip out and leave you to harvest the fruit and wonder why they left or to conjecture if they are impersonating that veteran philanthropist, "Uncle Johnnie Appleseed," whose honored name I love.

Such philanthropy I admire, but my inquisitive nature will not permit it in me; I want the whole thing and am patiently waiting for that "star of hope"—a harvest of big red apples.

CHERRIES—VARIETIES AND PLANTING.

(By W. H. Skinner, Bethany, Mo.)

The selection of varieties of cherries for planting must depend largely on the location, and perhaps somewhat on the particular soil in which they are to grow. I shall therefore confine my remarks to the varieties suitable to North Missouri, as my limited experience in growing them is confined to this region.

There are many varieties of what are termed the sour or pie cherry well adapted to this soil and climate; in fact, I have tried but few of them that have made an entire failure, but there are many varieties that I have never tried. Some of these are no doubt good and would stand high up in the list if once tried. I know of one variety that I have not tried, for the reason that every time I have ordered it some other variety has been substituted; but it is yielding good crops to those who are growing it here and giving good satisfaction. It has every appearance of having come to stay. This is the Wragg.

For commercial purposes the Early Richmond stands at the head of the class. It is a sure bearer, hardy and productive, and being both early and of good quality, when thoroughly ripe, it occupies the same position in the cherry orchard as the Ben Davis in the apple orchard, or the Concord grape in the vineyard.

Next in order comes the Dyehouse, about five days earlier than the Early Richmond, equal in quality, not quite so large, and with me not quite so productive, but on account of its earliness and hardness should always be largely planted in a commercial orchard.

I would rate as third the Montmorency, a few days later than the Early Richmond, tree a healthy and vigorous grower and productive, fruit medium in size and good in quality, and being intermediate between the early and late it fills the gap, which makes it valuable, both as an orchard tree and for home use.

For the late varieties perhaps the English Morello should be given first place. It is thrifty, hardy and productive and the fruit rich and good. The Ostheimer is a very productive and valuable cherry. I do not know whether or not there is any difference between the Ostheimer and the Ostheim, but there is said to be, both in the fruit and the origin of the tree. I have what is called the Ostheimer, and have never grown that called the Ostheim. The trees bear very young. The fruit is large, black and very rich and meaty, tree a somewhat dwarfish grower, but very hardy and thrifty, and from my very limited experience with it consider it among the very best, if not the best, of the late cherries of its class. The late Richmond and Louis Phillipe are both doing well here—have borne young and the fruit is large, rich and good. I consider them both promising, but from the limited number of trees I have of these varieties I cannot speak as surely as of the others, yet I would not hesitate to plant them here in quantity. Sklanka, Lutovka, Cerise de Ostheim and Suda Hardy, all Russian cherries, are very promising—trees hardy and thrifty, have fruited while young and small, and the fruit is late and fine, and I believe all will prove valuable varieties for this climate, but would not like to endorse fully until further trial.

All of these that I have mentioned stood the ordeal of the winter of 1898-9 without the loss of a tree, and many of them bore fruit in 1899, although the trees were quite young.

The varieties of the sweet cherry, so far as tested here, have not been a success. The Governor Wood has succeeded in a few cases. It is about as hardy in tree and bud as the average peach, and is worth planting for home use on account of the excellent quality of its fruit, but could not be recommended for a commercial orchard, on account of its liability to winter-kill. It is the hardiest here of the tested varieties

and appears to do best on very poor gravelly clay land, as on such land it makes a slower growth and seems to be more hardy and productive than when grown on a rich soil.

I have been looking for years for a sweet cherry that would stand our climate, and believe that I have at last found it. About 1896 I read in one of the bulletins of the Iowa Experiment Station of a sweet cherry, the Vilne Sweet, that was said to have withstood the cold of northern Iowa since 1882, and in the spring of 1897 procured two small trees one year old from bud. They both lived and have made good growth, and in 1900 one of them matured some fruit, which was very large and fine. These trees stood the winter of 1898-9 without losing even a tip bud, although other varieties of sweet cherries, peaches and native, domestic and Japan plums went down all around them. I have so much faith in this cherry and am so well pleased with its hardiness and the quality of its fruit that I shall plant it largely, as soon as I can succeed in raising the trees.

On the subject of planting cherries, I have learned but little, if anything, since writing on that subject for the Princeton meeting in 1899, and it is useless to take up the time of the Society in listening to a rehash of what I know on that subject, so will say that any one wishing to read what I know about planting cherries are referred to the 42nd annual report of the Missouri State Horticultural Society at page 211.

Discussion on Cherries.

J. J. Kiser.—I have a lot of wrecks of cherries. The winter made a wreck of my English Morello. I haven't any on the place now. I like the Dyehouse and Early Richmond. I think I will let the other varieties go.

Prof. Dutcher of Warrensburg.—Have any of you had experience with the Magnum or Governor Wood?

Judge Miller of Bluffton, Mo.—Yes; I have and think it is the best cherry in the United States. I have had trees four or five years to bear 7 bushels on them. Is an annual bearer. I have one Governor Wood, too, but the birds got most of them.

Member.—I have traveled quite a good deal, but I have never found anything that will beat the Wragg.

W. A. Gardner—Distribution of Apples.—I have had but very little experience with the distribution of the apple. Those who have been the most successful are the Californians. Now, there is an advantage in selling on the track, if we can get the prices. When we are selling on the track, are we not confining ourselves to the buyers proposition? We must have our own proposition. Our California people found that out

and they have a regular business system. The Southern California Fruit Exchange started out in a small way at first. It is a matter of political economy that the fastest means of distribution is the best. You can't afford to wait for a buyer to come to you to buy from you. We want to reach the different systems of the country simultaneously. We want to be able to market our peaches and apples at once and we can from the fact that the railroads are willing to join such an organization that will ship the fastest and safest. We could sell through agents, as the California Fruit Exchange does. They found that they did not always get their returns. Sometimes a car would be turned down. Now they prevent this by having the agent to be there and receive the fruit. We could reach the small towns through the agent plan. We would want to make as many car load towns as possible. The only way we could manage this right is to have agents to receive the fruit all along the line. They could leave a part of a car here and then take some more on to the next place, and so on. You would thus increase your car load towns three fold. What we want is to get markets. And I am sure they can be reached in this way. Of course we must have our system work hand in hand with the railroad people.

Mr. Evans.—Mr. Gardner's system of fruit distribution is a very nice one. But we want to go higher than that. I don't think there is a member of this Society or any fruit association but what can sell on the track at their own station. They may say we are subject to the buyer's proposition, but I don't agree with you there. Experience doesn't teach me so. Now we have had experience with strawberries and I know we got our prices for them. They came to us for them. We have a secretary who is in constant correspondence and who is posted as to the best prices every morning. He tells us what the market will bear and we sell for that. It used to be thought silly to think of selling fruit on the track. So did they used to think it not wise to sell cattle or hogs or sheep on the track. But we do it. We can make them come to it and make them give our price. I say let's sell on the track.

Mr. Wilmeroth.—I agree with Mr. Evans. I am a buyer, too. I think the California Fruit Exchange can sell on the track, too. One thing we need is better packing. We haven't very good packing now.

Secretary Goodman.—Yes, that is a fact. We need better packing among our fruit growers.

Mr. Nelson.—Packing apples in Missonri is a little neglected. I have been buying apples for the last 14 or 15 years and have only one or two first-class crops of packing done by the grower. But I can say that today we have some good trained packers. It has been hard work to educate those men to it. We don't have to send to New York to get

trained men to pick and pack the apples now. When a firm buys in Chicago, we don't have to have them send their trained men to pack for us. The farmers could do it as well as any one. And some of them can. I have seen it done.

PLUM OBSERVATIONS.

(G. E. Adams, Darlington.)

When I moved upon my place there were 4 trees of the Chickasaw variety which bore a few plums, and but a few of them ever matured right. Thinking I would have some fine ones, I set out 3 or 4 kinds of the Japanese variety, but the cold winter of '98 and '99 knocked them out, not caring to invest any more at that time in what seemed to be an expensive luxury (as several of my neighbors were caught heavier than I—one, about 300 trees and three years' care). So I turned attention to my other trees which was not hurt at all. But allow me to say here that the right thing to have done was to set out more trees, for they may not be killed again for years. Well I took some instructions from the Horticulture reports and went after the bugs first by scraping off the rough bark and banding them with leather bands. Then I sprayed them three times—once before blooming with Bordeaux mixture. Now I thought I would give them a good dose: I used my sprayer, but gave them a good washing every time. It did not seem to injure the trees or the fruit the least bit. I was laughed at a good deal by people passing and I heard one woman say as she passed by "Now what kind of a foolish business has he got on them trees;" but when I told her what it was for she said she guessed she would try it. Well, foolish or not it was the best crop I ever raised, about 90 per cent. being smooth and sound. I will treat all of my trees the same way if weather will permit and set out some more of my native sprouts this spring.

Thursday, 8 p. m.

The program of the evening was varied by piano and vocal numbers.

HORTICULTURE.

(By G. H. Malone, Columbia.)

Third Prize Essay from Short Course Student.

There are but few people of Missouri that realize the possibilities of Horticulture in this great State, provided the same care is used in the selection of seeds, plants, varieties, location and soil, and provided the same management is used that a successful farmer or business man employs; that is, if a person has some knowledge of Horticulture. And there is no place in the world where one can obtain that knowledge in so short a time and at so little cost, as in the Horticultural department of the Missouri State University.

Care should be taken in the selection of seed or plants in Horticulture, as in the selection of any other seeds. A great many apple seeds are imported from France, and are also procured in America, in like manner; that is, they are saved from rotten, and knotty vinegar apples, and are more or less diseased. How can any one expect to get good, strong, healthy plants from small and inferior seeds. To get the best results, you should be as particular to select the best seeds possible as you would in selecting seed wheat; so it is better to devise some plan to get seeds from the very best, healthy fruit, or send to some reliable firm in that business. Take these seeds and drill thickly, in rows 4 feet apart, and cover about 2 inches deep. The soil should be a deep, rich loam, well drained, with good subsoil, and in a year they will make good, healthy stocks; so the next thing to consider is the selection of scions. Stock breeders, in selecting animals to breed, select those of the very best type and quality they can procure; so it is reasonable to suppose that in order to obtain the best results in fruit culture, you must select scions and buds from trees that have been fruited, and from trees with fruit of the best type, color, quality and quantity, instead of from those you know nothing of. In fact, this is proven to be true from the improved varieties coming from well selected seeds and scions, with good cultivation.

Take these one-year-old seedling roots, and scions of one year old wood, cut scions 6 inches long and graft on 3 or 4 inches of root, then plant in rows 4 feet apart, with 6 or 8 inches between the plants, after dipping in thin mud; and press the dirt firmly around each plant.

The time to head is in the spring of the second year, when the twigs are tender, so the bark will not peel off. Strip the lower twigs as high up as the head should be. The nurserymen will have to head trees from 18 inches to 3 1-2 feet high, to please their customers, but the best height to head is 18 or 20 inches from the ground. Don't be deceived about whole root grafts, for nurserymen do not sell such trees. From 75 to 95 per cent. of these grafts, if planted in good, rich loam, well drained, and with good care and cultivation, should make a growth of from 3 to 4 feet the first year.

In selecting varieties of fruit for an orchard, you must consider the commercial, canning and evaporating values, or whether they are wanted for family use or home market. It will probably be better, after these few general remarks, to take each fruit separately, so we will first take up the apple.

Only first-class, well-rooted, and evenly-headed 2-year-old plants should be used. In selecting a site for a commercial orchard, you should consider the location in regard to market, to land and air drainage, and also soil and subsoil; for the first-class orchard lands of the United States are somewhat limited. The best soil is a black, sandy loam, red soil, or loess. The best subsoil is gravelly, loess, clay shale, or red limestone. Land should be high in regard to the surrounding country, so cold air will drain off; and it should be somewhat rolling, so the water will drain well. The orchard should be close to a railroad, with direct transit to market, and varieties should be selected to suit the market.

In preparing land, new land should be plowed in the fall or winter, and well pulverized; old land should be plowed with a subsoiler and sowed to peas the year before planting. But I think, rather than wait a year to enrich the land, it would be better to plant the trees and then fertilize with peas. On hill land plant them 25 feet apart each way, and on valley land, 27 feet apart, then fill in with "Missouri Pippins," cating the "Pippins" out when the trees get too large.

As you set out the trees, prune them to match the roots, and have the tops as near the shape of a cone as possible. Plant the trees about one inch deeper than they stood in the nursery, throw some loose dirt around the roots, and move the trees so the dirt will settle around them well, then tramp firmly. In pruning your apple trees, always leave some young wood and cut out all interfering limbs; "have a reason for every cut you make." Do not cut half of the limbs from a tree, for there have been about as many young orchards ruined by pruning as the insects have destroyed. Prune old trees to produce new growth, and new growth will produce more fruit and better quality. Prune large limbs 3 or 4 years old, but prune only one-half the first year, taking 2 years, so it won't be too severe on the tree.

Cultivate your trees as you would a corn crop, only better, and all summer. Plant corn or small fruit or potatoes between the rows, or anything to keep the weeds down, so all kinds of insects and fungus will not have a place to breed and thrive.

The wooden wrapper is a good thing to put around the tree to protect it from the sun, from borers and rabbits. There are many insects to fight; the Round and Flat-headed Borer, Codling Moth, Gouger, Tree-hopper, Leaf Folder, Woolly Aphis, San Jose scale, and others too numerous to mention. For the Woolly Aphis, insert carbon-bi-sulphide into the ground, within 1 1-2 to 2 feet of the tree, or dig the dirt away from the roots about 2 feet from the tree, and dust powdered tobacco around the roots. For the other insects and fungus diseases, use arsenical poisons and kerosene emulsion; keep the orchard clear of weeds, and wash the trees with lime mixed with coal oil and lye.

The Bordeaux spray is made in several different ways, in order partly to suit the plant or insect, but all should have arsenic added. The arsenical poisons are arsenate of soda, arsenate of lead, Paris green and blue vitriol. Kerosene emulsion has been mentioned, but raw kerosene can be used with the spray pump with kerosene attachment.

In gathering fruit, roll the apple so the stem will stay on it. In sorting apples for market, have three grades; extra fine, No. 1 and No. 2. No. 1 must be nice, large, smooth apples and No. 2 must be sound, smooth apples, but not so large. In packing, take the bottom out of the barrel and put two layers in with the stems down, and then fill with the same grade of apples.

If apples are low on the market, send them to a cold storage building, or make a cellar with double walls and doors; have it well ventilated, keep it clean, disinfect with whitewash and carbolic acid, and fumigate with sulphur, if necessary. Keep the cellar as near 40 degrees as possible, and have the fruit in tight bins or barrels and boxes. Ship large specked apples to a canning factory or evaporator, or get a cheap plan of an evaporator, and evaporate at home. Use all the rotten and little, knotty apples for vinegar. Clear all the rotten fruit and trash out of the orchard.

For peaches, the land should be about the same as for apples, only the soil need not be so rich if the subsoil is good and deep. A north hill slope is best, as the buds are not so apt to put forth so early that the frost will kill them. Peaches should be budded in August; tie with raffia, and leave 10 or 15 days, then cut the string. In the spring cut the tree off just above the bud, and graft those that fail to grow. Use a piece of 2-year-old wood at the bottom of the scion. Strip off the sprouts below the bud when about 3 inches long.

It is best to plant one-year-old trees, or two-year-old trees if extra care is taken with the roots. More care should be taken in heeling peaches than apples when they are taken from the nursery row. The best time to plant is in the spring. Make holes large enough so the roots will not be crowded, and put loose dirt around them and tramp it in firmly. Plant 16 1-2 feet apart each way.

The first year's pruning cut all branches off, but not too close; leave the bud under each branch. After the first year, in pruning, leave about half of the one-year-old wood and keep the tree in good shape, as near conical as possible. When the trees get old and large, it is well to cut back into 3 or 4-year-old wood to renew the growth.

In spraying for insects and fungus diseases, on tree and fruit be careful, as peach trees are very tender in regard to poison. Do not use arsenate of soda, but use arsenate of lead or Paris green, and make a weak solution.

Do not let the tree have more fruit than it can hold up; the peaches should not be closer than four inches. Gather as soon as the fruit parts easily from the stem. It is better to make from 3 to 5 pickings. In shipping, pack fancy in 4 to 6 basket crates, 1-3 bushel boxes for No. 1 peaches and 1-4 bushel baskets for soft ones.

The great trouble in raising pears is the blight. It is a kind of fungus disease that affects the tender twigs, and then spreads. The Standards blight the worst, so it is better to plant on poor, high, heavy clay soil, as the growth will not be so rapid, and it is not so apt to blight. The Half-Standards are not so easy to blight, for they are grafted on quince root, with part of the scion put underground, so it will take root and the quince root seems to check the growth of the tree, so it does not blight so badly. Some varieties will not do any good, only as a dwarf, so they are grafted on a quince root, with the scion above ground. Plant 12 1-2 feet apart, and dig the holes deep and large, so you can get plenty of loose dirt around them, but tramp in firm.

Head pears low, and prune back a year's growth about half. Cultivate for three years, then sow to grass. Gather as soon as the stem of the fruit will part from the tree, and put in boxes and barrels in some dark place to ripen.

Propagate the quince by grafting on apple root one inch long, and also by cuttings. The best soil is heavy, limestone, clay land, with good top soil, well manured. Cultivate for about two years, then mulch.

Graft the cherry on "Mahaleb" root, or "Morello" and "Mazzard" in South Missouri. In grafting at the crown, use the whole root. Bud in July while the stocks are growing rapidly. Plant on good, rich soil, high and dry, with good subsoil. Plant in the spring, and dig large

holes, placing the dirt well around the roots. Prune as little as possible; only shaping, and cut out the dead wood. Cut back old trees to renew them and take two years' to renew. Cultivate well for at least five years. Pick with stem on and pack in 24-quart crates, using dry measure. It is well to plant Russian mulberries with cherries for birds to eat.

Graft the plum on "Myrabalan" or "Marianna" root in winter, and bud in July. Never graft on a peach root. The American varieties are about the only ones that are hardy in this country, but they are inferior in quality to some of the other varieties. The "Wild Goose" is the standard variety in this country, but it would be well to plant a few of the hardiest foreign varieties.

Plant in clusters, and prune about the same as the peach, cutting out the surplus in European varieties, and if you have the "Wild Goose," have some other variety to fertilize it. The plum and cherry have insects and fungus diseases to fight, so begin in time and keep them in check as much as possible. Pick plums before they get too ripe, and put in 24-box crates and 1-3 bushel baskets for market.

The strawberry is probably the finest berry that grows. There are two kinds of strawberries, the Staminate and Pistilate, and if you have a variety of Pistilate, some variety of Staminate is needed to fertilize it. Fairly rich soil should be used for strawberries. Set one-year-old plants in rows 4 feet apart and 2 feet apart in the row, and put the crown just at the top of the ground. The runners root readily, so the plants multiply rapidly. Pick berries with the stem on, and after they are gathered, plow the rows so they are not over 9 inches wide. Mulch about an inch deep in winter. There are several insects and fungus diseases to fight with different sprays.

The Black Cap raspberry is the most profitable, but others may be grown for family use or home market. Plant in rows 8 feet apart and 3 or 4 feet apart in the row. Pinch at 18 inches high the first year and 2 1-2 feet high the second year; the best fruit grow on laterals, so prune them in the early spring from 6 to 12 inches long. The laterals take root readily so you can easily propagate. Ship in 24-quart crates.

Treat blackberries similarly to raspberries, only you need not pinch; and grow them from young sprouts, and from root cuttings. Put the crown 3 or 4 inches under the ground, and raspberries only one inch. Cultivate both well.

Currants and gooseberries propagate from cuttings, and should be planted in good rich soil on the north side of a fence or building. Use two-year-old plants to set out, cultivate two years, and then mulch heavily. Keep the old wood cut out of the old plants, and also sprouts, if they get too thick. Cultivate well and often.

The grape is probably one of the oldest cultivated fruits, and has an extensive history. The settlers of America could not grow the European varieties, so they had to graft them on the wild grapevine root of America. This gave an inferior quality to the American grapes, and they have never reached the fine quality of many of the European varieties.

The grape needs a good, rich, well drained soil. They can be propagated by grafting, layering and cuttings. Make cuttings 12 to 18 inches long and put all of the cutting in the ground, except the top bud. There are many ways to prune the grapevine; the Kniffin, Fan, Renewal and other systems. The Renewal is probably the best of all, as it keeps most of the vine young and vigorous. The vine and grape are preyed upon by many insects and fungus diseases, the most of which are overcome by spraying with arsenical poison.

Some of the nut fruits are quite profitable, and desirable for home use. The pecan nut should be bedded in the fall, and planted out in the nursery row as soon as they burst open in the spring. Leave them for two years, then transplant, after cutting the tap root, into the nursery row, for another year. Then plant in the orchard 20 feet apart each way. A rich, well drained bottom land is the best place for them.

Put the chestnut in a box of sand and keep moist, where it will freeze, and plant in the spring the same as the pecan. Land for the orchard should be high and dry. It is about as cheap to buy pecan and chestnut trees as to grow them yourself, unless you make a business of it. If I were growing a nut orchard of my own, I think I would grow some hazelnuts. And I think I would have some persimmon trees in my fruit orchard.

Let me emphasize the fact that there is no use to plant any of these things if you do not care to cultivate them.

Nearly all the varieties of evergreens are grown in France, and it is cheaper to import them than to grow them here. More care must be taken in planting evergreens than deciduous trees. The roots should be put in water as soon as taken from the ground, or kept moist in some way till they are planted again. They are more sure to live if they are transplanted every year or two while young, as they get a better, more compact root system to feed the plant.

The is one great enemy that the fruit grower and nursery man have to contend with, and which is not thoroughly understood; and that is the fungi.

Fungus was not known fifty years ago, but shortly after this time M. A. Curtis collected fungi in the Carolinas, and sent them to Burkley, an English nobleman. Forty years ago Peck took up the general study,

Early in the seventies Dr. Burell of Illinois University began the study of smaller fungus diseases, and made considerable progress, and brought several interesting facts to light. About twenty years ago Dr. Farlow began to give all of his time to the study of fungi.

Then came Arthur, Trelease, Shaw, Earle, Smith and others who did considerable work on grape-rot, smut, apple-scab, apple-leaf rust, pear blight, etc. In 1885, the Department of Agriculture took up this work. About this time, the Bordeaux mixture was discovered by an ingenious fellow near Bordeaux, France, in trying to duplicate verdigris, a poison to keep grape thieves out. It is a mixture of blue stone and lime.

In 1887, the Government placed Galloway, of the Missouri State University, at the head of the department on fungi, and he issued an instructive bulletin on the subject. The State Experiment Stations were established in 1887, and they have done considerable work along this line.

Science is making rapid strides in solving these problems of fungus diseases, and also the insect question, so people can go into the fruit business with more certainty of success. Then fruit will cease to be a luxury that only the rich can afford, and the common workman and his children can enjoy fruit of the finest quality. Fruit will be the mortgage lifter of the land, and prosperity and peace will reign supreme in this section of the great west.

TEACHING THE ELEMENTARY PRINCIPLES AND THE WHYS, WHATS AND HOWS OF AGRICULTURE IN THE COMMON SCHOOLS.

(By G. B. Lamm, Sedalia, Mo.)

In the beginning of this paper it is best to state that the teacher who tries to teach too many of the *how's* of Agriculture will have some difficulty in reaching satisfactory results. For this reason, that the *how's* on one farm and under one condition will differ a little from the *how's* on another farm and under another condition. Also if a teacher wishes to instruct pupils in the *how's*, she will have to be supplied with experimental grounds, seeds and tools and be well versed in the practical arts of agriculture. Even this is not impossible under many circumstances and in many places.

But teaching the *whys* of agriculture to the boys and girls is far different. There are no insurmountable difficulties in teaching the *whys*

of elementary agriculture in our common schools—absolutely none. Why the maple-seed has a wing, the grass color, or the nut a shell; why plants need moisture, warmth and light in order to grow; why the flower has beauty and fragrance; why the leaves wilt in warm, dry weather; the roots grow in proportion to the tops, and the trunks round and strong; why grow shade-trees and flowers; why do some plants need rich soils; why fruits rot, seeds mould; why prune, cultivate, trellis; why do plants deteriorate; why graft, bud, protect; why are green fruits sour and ripe fruits palatable; the *whys*—the many *whys* can be taught and understood in every district school.

So can many of the *whats* be taught. The teacher can teach what the seeds, bulbs, tubers, leaves, rootlets, fruits, insects, soils, plants and their uses are. She can explain and pupils can learn by observing, touching and tasting, what multitudes of useful things are, and what their habits and diseases are. This enables pupils to be familiar with things around them, and they know and can talk about what other people know and speak, and they feel at home wherever their feet press the soil. Children delight in this kind of knowledge. They like to study in this practical way the insects, birds, soils, fruits, seeds, plants and kindred subjects—object lessons all around them of life and growth. Let us give them a chance. Let us bring them into touch with nature and nature's lessons. Why not teach the needs of the age in which we live instead of ancient geography, the dead languages, mythologies and religions of the long ago? They are the old worn-out working clothes of the race and don't fit now and are out of style. Why not bring the objects we see around us and with which we have to do, into closer fellowship by becoming familiar with their habits, diseases, growth and materials? This is the best of knowledge. The children know but comparatively few of these things even at the time they leave the common schools, and they should not go out into the world without this knowledge.

Our school rooms are not in touch with the living present—the year 1901. Why not know the useful things—things that can be put into practice in every day life? The agricultural world is the world in which we live and work. It feeds us. It clothes us. Through it we get our temporal blessings and, when it fails, we starve, we die. We read how thousands die annually because they do not know those things which unfold a knowledge of nature's resources.

How very different from one, who does not know, will a man or woman who is familiar with the best varieties of tree, flowers and fruits, who knows about the best locations and modes of cultivation, who is acquainted with the terms used in agriculture, horticulture and floriculture, who can point out the fungus growths and injurious insects—I.

say in what a different manner will he go about developing the hidden resources of his state or beautifying his own grounds or feeding his own body.

What a lost world the whole subject of agriculture, horticulture, floriculture and gardening is to a soul that knows nothing of it. What a source of constant blessing it is to him who lives among its uses and beauties and intelligently holds converse with the charming life and utilities with which nature has clothed the plant, flower, fruit and field.

Heaven is not so far away when we fit the living for the earth and the earth for the living. Let us allow the dead past to rest. We don't live in the past but in the present. We live in the twentieth century and want to be in touch with it, and not the dead centuries gone by.

It most certainly is evident that the teachers of the near future will have to teach the fundamental principles—the *whys*, *whats* and *hows* of agriculture in our common schools. The best friends of the children favor it. The age demands it. The knowledge of it will fill a want that nothing else can fill. If objections are made that there is not time to do these things, then cut out the worthless and useless from the readers, geographies, grammar and arithmetics, and put this in their place. It will be a blessing to all who will have to solve the problems of the future, to lose those and find these.

If you will take the children into these new fields of agricultural, horticultural and floricultural knowledge, and let them study the flowers, grasses, fruits, grains, birds, useful and destructive insects and fungus growths and teach them the *whys*, *whats* and *hows* of such things, you will be able to get enthusiasm into your classes and inspiration into your school work. These things have voices that appeal to childhood. Such languages as these living, growing, useful, things can speak, our youth can learn, and remember and use. They will never forget what these things say, because every part of speech is a living, breathing thing. Nature teaches lessons of growth and life, lessons of perseverance, lessons of industry and economy, lessons of purity and thrift. While a child is learning one Greek or Latin word and its endings, it could learn hundreds of these useful things, and when once learned they would bless the child every day it lived, while the Greek or Latin is soon forgotten, and drops out of the every day life.

The elements of agriculture are introductory to the study of the deeper sciences of botany, zoology and chemistry. It serves to develop the child's powers of observation and retention. It will awaken sensations and stimulate the reasoning faculties. Boys and girls will not want to run away from this kind of school work. They will be charmed with it.

Then, too, the teacher will have a subject to teach that has a heart in it. It will be a living subject with many channels for original thought and investigation. It leads on from school life into a real life of usefulness and duty and happiness.

Great changes have taken place in the last decade in the minds of parents about what they want their children to learn. People now patronize business colleges, industrial schools, kindergartens, cooking schools; and just a little later on, let us hope, they will demand that the fundamental principles, the *whys*, *whats* and *hows* of agriculture, shall be taught also, for man cannot attain to nor enjoy the higher intellectual, social, and aesthetical life unless the earth be correspondingly fitted to suit the wants of his more refined nature.

TEACHERS OF NATURE STUDY.

(By Prof. Whitten of Columbia.)

Ladies and Gentlemen: A few years ago I made the acquaintance of a young gentlemen who was bent on going to school and getting an education. He finished the high school course but was not satisfied and so went to the State University and went through with his class and all supposed he would go out in the activities of life with his class, but he did not see it that way, so he stayed at school and took a degree. Then he decided he would stay and take the degree of Bachelor of Arts and so he did. But he had higher aims so he stayed and took the degree of B. S. Finally, he decided he would take a professional course, so he went on till he had the M. D. to his name. But still he was not satisfied and so went on and had Ph. D. After working very hard in the school for about 12 years he decided he would try teaching for a while. So he began to look about for a school, but couldn't find one to suit him. After trying for some time, he finally settled down to a little country school of a few months at \$35 per month. Then when his term was out they didn't want him again. Yet this fellow was an educated man. After this he thought that he was not complete, so he went to Germany to finish his education. I ask what is the cause of all this? Why, it is because the poor fellow never learned to apply what he had acquired. He was so busy with storing his mind with facts that he did not have time for anything else. He was just full of dry facts and theories and did not know how to apply them. He did not understand the walks of life any better than he did before he stored his mind. He was a book worm. Instead of thinking of life and its realities, he kept reading, reading, the facts,

innumerable facts. I am perfectly satisfied that you can just cram and cram facts into your minds and then really know no more than when you started. So far as we are storing up facts and not understanding all about them and the nature of things, we are failing. When we learn to reason and use these facts, we are, of course, very useful. I think you will agree with me that the education of today is becoming more practical.

We are not just spending our time in reading and reading and getting dates and dates, but we are beginning to look at the problems of life and try to understand them for ourselves. Think how to apply what we learn. We are beginning to teach our little people something about nature study. In some cases, we call it horticultural work. We like to study live things instead of reading nothing but plain dry facts. I believe that this is a very good thing. A good thing that is coming about. To make our children study about the things around us as the horticultural people are becoming interested in our education in our public schools, we have hopes of doing much along this line. I will mention a few things along this line. About five years ago we began teaching horticultural work in our summer schools. We had it in the summer schools, because that is the time to take it. At first, we enrolled 11 in that course. We did not do a great work at first, but we noticed the plants around us. We studied how a plant propagated itself, how the little seed was changed into the little plant. We took up the study of plants all the way through.

Many of our teachers are now taking up this method in their schools. The Carthage schools have. They begun with the window-box studies. They put them in the window in the school rooms in the winter so that they might get interested and study them. They finally planted things in their yard and you have no idea of the work they did and how much it added to the beauty of the yard and it caused others all over town to become interested and beautify their own homes. The school gave prizes for this kind of work. They gave prizes for the best kept front yards, prizes for the best kept beds of different kinds of plants. Had regular contests and awarded prizes. That was the way the city began to beautify the walks and lawns and drive-ways. It is wonderful how such an influence will spread. How it makes the town more beautiful, how it could make the streets prettier. It teaches us the nature of things and at the same time causes the young to learn to love work and at the same time teaches many a lesson in horticultural work. They learn to think and then to apply what they do know. One school that I remember, and that is the Columbia high school. The teacher began the work there. He took up the work by putting up window plants. He

was afraid to say much about it. He did not want to tell any one that he was going to have a window garden in the school room. He had his room just as pretty as could be. Fixed up the old laboratory as nice as he could with flowers and plants. Swept up things nice and clean. Had everything as pretty as it could be. While he was doing all this work, the children were very anxious to know what he was doing, so they would peep in under his arm and were awful curious to know what was going on. In a few weeks they wanted to know all about it. Finally he told them what he was doing. Pretty soon they wanted to do something in this work, too. He told them, yes, they might get some boxes and fix them if they wanted to. As a result he said one day, well next Monday is a holiday, how many of you would like to take that day and fix up a nice little school garden. They were all in for it. They put up some good benches on the west side of the room. They then went to the woods, in February, and scraped the dry leaves and sticks all off and got all kinds of things. They began to sort them out. One part of the stand for this curious thing and another part for another curiosity. He said for them to watch these things. They had a collection of onion-like bulbs. He had them to set them. After a few weeks they had a very pretty garden there. The onion-like bulbs became the pretty little spring beauties that we all know. They had the Columbine and Lillies and all sorts of things. These children had never seen anything like this before. When the seeds began to germinate they watched them and they began to try to find out all about how the plants started. When they had done all this, he began to teach them about outdoor gardening, too. The little fellows began to be interested and wanted to plant tomato plants. Now this is just what he wanted them to do. So they took their February bench and put sand and good soil on it and soon had little plants to take out to their beds. He gave little prizes for the best kept flower beds and the best kept garden beds. All this work did not require a single lesson to be learned. He did not ask them to do this but just let them do it themselves. And they lost no time at all from their lessons. The influence did not stop there. Everybody came there to eat their lunch. The other teachers saw this and began to think whether they couldn't get something like this to interest their pupils, too. That caused them all to take it up.

Now the next year, we had 15 in the course and the next year 25, and last year, we had 75. Last Monday when I left, we had a large number and they were still enrolling. That was one reason I was not with you at first of the meeting. I felt that I could not leave them. I don't see why this work shouldn't be taken up in our country schools, too, as well as anywhere else. Why should not a better knowledge of

plants make a better farmer. He can study while pulling up weeds. I believe we need to work up some method for this kind of work in all our schools. One year I tried an experiment. I tried a class of little boys and girls to see if I could make the work interesting to them. I began to study how to do this. One thing of importance is to have something for the little ones that is full of life; something that they can see that is growing and moving and that they can work with. At first when there were no changes in the seeds they did not seem to care much about it. But when the seed began to swell and send its little roots down and send its little leaves up, their interest became great. They wanted to look at them every little while.

If you want the attention of a child, you must get something active. Must have life in it. Now I hope that the teachers will take up this work all over this State. I hope their work will prove a prominent feature for good for the children. But I have used as much time as I should for this thing. I thank you for your kind attention.

HORTICULTURE AS AN EDUCATIONAL FACTOR.

(By C. H. Dutcher, Warrensburg, Mo.)

My subject affirms that horticulture possesses educational value. No man who has worked at the business very long will demand proof. Indeed one might say that horticulture considered not only as vegetable and fruit raising, but as floral and landscape gardening as well, is an education in itself.

But will horticulture studied and practiced educate our boys and girls? If we consider education as the discipline of intellect and the regulation of the heart, I answer, yes. If we consider it a means of developing the physical, mental and moral powers of the individual, I return the same answer. If we consider education as the training of the individual—to train his hand, eye, ear or muscle; to train him to careful observation, and to be careful of his assertions; to make him generous, and love his neighbor as himself, I still say, yes; horticulture is a great educational factor.

But to be more specific. Science is said to be classified knowledge. The whole range of education as once considered, even in our own day, consisted in getting a knowledge of facts, classifying this knowledge, and then investigating the causes, the effects, the whys and the wherefores. This process led us into the fields of philosophy. Its tendencies were to-

ward the higher education, the education of the professions. It was both literary and classical, and was for the benefit of the few, while the masses were ignored.

Today new principles obtain. We believe in an education that will enable each one "to support himself." This is the education of the common schools. It should be practical and for the masses.

We believe in an education in all "that a man can utilize." This includes the higher, even the professional education, is both literary and classical, and of necessity for the few.

Yes, we go further. We believe in a fuller American education, in an industrial education for all who "have an aptitude to receive it, and will use it when they get it."

As such an education will assist a greater number to the education that will enable each one to support himself, industrial, and perforce. Horticultural education should begin in and be a part of the common school education. This may involve some changes in our present methods, but let it not be forgotten that the education of the past was, and even yet is, doubtless, "too exclusively literary, and should pay more attention to the manual and industrial training;" "too exclusively intellectual," and should pay more attention to moral training.

In any education, however, just three classes of facts concern the educator: viz., facts of God, facts of nature, and facts of man. The facts of nature and the facts of man concern us most in this discussion; but do not think we ignore the facts of God. Few horticulturalists are godless men. I know not one infidel in our ranks—nor do I see how one can fail to see God in every leaf and blossom and fruit.

If we study nature we find only three kingdoms—the crystal kingdom, the plant kingdom and the animal kingdom. The horticulturist must study the nature, composition and condition of his soil. Everything he raises belongs to the plant kingdom, and while he finds many enemies in the animal kingdom, he also finds many friends there. All three of these kingdoms of nature, then, become at once his domain and he must study them.

If we teach the facts of man, we must consider him as body, soul, spirit, or body and mind. Horticulture trains and develops the body as only few other callings can do. He must use his eyes closely and constantly. He must train himself to close observation. He must train his hearing for by this sense as well as by sight, he will recognize both his friends and his foes in the orchard. In fact, not a sense do we possess that does not find full scope for its activities in horticulture.

Would you develop a healthy body? The horticulturist is particularly blessed. He breathes the purest air, and on our western prairies

an abundance of it. The health-giving properties of the freshly upturned earth are his to enjoy to their full fruition. Not a muscle that develops a strong and healthy body is neglected. Reaching after dead or broken limbs, or limbs on which the cankerworm is hatching, or after the beautiful, well-ripened fruit, develops his reaching muscles. If his trees are large, and he gathers his crop himself, he will necessarily develop his climbing muscles. In running his spray pump, all the muscles of arms, back and breast are exercised; and if he digs out the apple tree and peach tree borers himself, he will develop his kneeling muscles in a way not known to the churches since the days of the old fashion camp meeting.

Education, however, is generally understood to apply to the mind. Does horticulture educate the mind? While mind is one, we may speak of it as consisting of intellect, the power to know, sensibility, the power to feel, and will, the power to determine. Knowing, feeling, willing, constitute the whole of mind's action. The intellect idealizes, thinks, reasons. It can do nothing else. In other words, we get ideas, think them into thoughts, thus forming judgments, and use our thoughts as premises in syllogistic reasoning.

Our ideas are primary and secondary. The primary ideas are obtained through sense perception, conscious perception and intuitive perception, and in each case close and careful observation is necessary. Now, do you know of any occupation that requires closer study, more careful observation, more painstaking methods than the proper care of trees, plants and shrubs? I do not. In my younger days I was a close student of books. In later years I studied more carefully in field, in garden, and in forest; but I have often been surprised by the close observation and consequent knowledge of the men and women with whom I have associated in this Society, men and women whom I knew had not had the advantages and facilities I had enjoyed.

Having thus carefully observed the facts, obtained our primary ideas, we use them in reasoning, the most common methods of which are reasoning by induction and by deduction. In inductive reasoning we pass from particulars to generals. These particulars are obtained by observation and by experience. If we have made faulty observations, or too few of them, and attempt to draw therefrom our general conclusion, that conclusion will most likely be proved wrong the very next season, and we shall be compelled to retract. So also it may be, should our experiences prove too limited, or had under too many accidental circumstances.

This mode of reasoning requires great caution. It is the one most frequently employed by us. It makes one modest and careful of his

assertions. With this I was much impressed at Carthage in December, 1895, the first meeting of this association I ever attended. The best informed men and women spoke cautiously when answering questions, or presenting papers for discussion. The whole meeting was remarkable for the absence of any thing like dogmatism; and such is the case very largely today. Many things are to be considered before we can venture a dogmatic statement.

To illustrate this necessity, I quote from our reports of 1899 and 1900. Our Secretary takes great pains to give us full reports of all that is said here likely to be helpful to our absent members or others interested in this great work. But suppose some one should read our reports as carelessly as some of us read other books, that is, make "texts" of single sentences, and often of parts of a sentence, and thus fail to consider the location of the writer or speaker, the kind of soil, the character of the cultivation given and required, the effects of frost, and many other things of equal importance, would he learn anything? Let the illustration answer.

In speaking of the York Imperial apple one man said, "No other apple seems so tender." Others said, "I do not think you will find the York more tender than anything else."

"I do not think the York is a tender tree."

"York Imperial stands ordinary winters as well as any."

One said, "In one orchard 91 per cent. was entirely killed." Another, "After a winter of 30 degrees below zero, we had a fine crop of York Imperials."

One nurseryman said, "Our customers complain of blight on York Imperial." An orchardist replied, "I have no blight." And another said, "I have 500 York Imperials, and am not losing any—they don't blight."

In speaking of the Missouri Pippin, one man said, "It is subject to leaf curl, and some growers have discarded it for this reason." Another replied, "I have seen no fungus which causes leaf curl."

One said, "The Missouri Pippin is more subject to aphids than other varieties." While others said, "I would use Missouri Pippin for temporary trees." "In the near future I am going to plant 10 acres of Missouri Pippin."

In the further discussion of varieties we find the following interesting contrasts:

1. "I would not give the Ben Davis too much prominence." "The Ben Davis is the all-purpose apple."

2. "The orchard of the future will have but few Ben Davis trees." "The Ben Davis has been and is today a money maker."

3. "We find that the Rome Beauty beats the Ben Davis on the home stretch—15 or 20 years."

"The Ben Davis apple, like Grant's Generalship, is often criticised, but always triumphant."

What conclusion would a careless reader draw from such passages? They are all verbatim quotations save one. I imagine he would say, those bug hunters and worm catchers down there can give each other the lie in the politest way I ever saw. But let him read it as we try to tell it, consider the things we are careful to consider, and he would see that we do not dogmatise.

Possibly the members of no profession are more ready to learn from the experience of others than we are. This is no easy thing in many cases, and even here we must be careful. I think Prof. Stanley, in the winter meeting at Princeton, belittled experience too much. Still he was right in contending "that the first essential to successful orcharding is a knowledge of nature's methods in the economy of plant life, and the conditions favorable to health, growth and fruitage, that we may assist nature by operating upon conditions when they are found to be at fault." The experience of such a man told on this floor or printed in our many excellent journals is of great value; and bigoted—short sighted, at least—must be the man who persistently refuses to attend these meetings or take one of our journals when offered to him at 20 cents a year.

The expression, "Experience is a hard teacher, and fools will learn by no other," is very applicable to such fellows as I was when I employed a brag to prune my young orchard. He had had great experience. What he knew he had learned by experience. Mr. So and So over there or down here don't know anything about apple trees. I can fix them just right. And he fixed them. I was wiser. I learned from his experience. In fact, had some of my own, and learned later that my tree doctor had never attended our association or read a journal.

About that time I learned another lesson. Let me give it to you by way of advice. Never employ a widower over 45 years old to dig the borers from your trees. He can't see well enough, and should he want to marry—and most of them do—he won't wear glasses. As a result, the next year you can dig out your own worms and carry a few trees out on your back.

Thus we see all our intellectual faculties are trained in the pursuit of horticulture; and if we include floriculture and landscape gardening, as I have done, the aesthetic faculties will certainly be trained, and thus the whole man educated.

Here, perhaps, I should close, but I wish to ask what can be done to secure a larger recognition of this education in our schools? We have already seen that horticultural as well as industrial education belongs to the common school. The report of the Committee on Horticultural Education at Peirce City is very valuable. If any of you were not there, you should read it and study it carefully. Some of the recommendations there set forth seem to be bearing fruit. I notice that in the course of study for teachers' institutes this summer nearly one-fourth of it is devoted to practical agriculture. I am sure that if the teachers will qualify themselves to do what the State Board has sent out for their institute work, the pupils in all the schools will make more rapid progress in all their other studies next year.

Such teaching sharpens the intellect, develops observation. The pupils soon learn to see things—not to look at them, or necessarily for them, but see them almost without looking. The mind thus aroused, quickened, sharpened, grasps all the lessons more readily, and hence learns faster.

We may not get horticulture recognized by name in the curriculum of the public schools, but the youths in these schools will soon get much of that "something under it to start with" in order to get that "intelligent experience" Prof. Stanley talked about at Princeton. They will have the foundation laid for that "knowledge of nature's methods in the economy of plant life and of the conditions of health, growth and fruitage," that will enable the horticulturist of the future to "assist nature by operating upon conditions when they are found to be at fault," far more intelligently and successfully than we have done.

Mr. Lamm of Sedalia, Mo.—I just want to say a word about this kind of education. You can go through a great many of our schools and not take Greek or Latin at all. I believe this is a good thing. I believe it is because we are becoming more practical in our views of education. I want to say to the people of this town that I believe it is your highest privilege to ask that your teachers take up this work in your schools here. Have them give the pupils some little lessons in nature study. And in time to come it will develop into something that will surprise you. They are doing this in other places. If you will try it here, I know you will be pleased with the results.

REPORT OF COMMITTEE ON FINAL RESOLUTIONS.

To the officers and members of the Society:

The Missouri State Horticultural Society, as an association and as individual members, congratulate themselves on being invited to hold their meeting at New Haven, and in their accepting the same.

Words would be hard to find to express a more cordial welcome than that extended by Mr. Dougherty when he "delivered the keys of the city" to us. The address was eloquent.

We extend our thanks to the people of New Haven for not only their welcome and their entertainment, but for their attendance and help at our sessions. A thing well done and in the right spirit carries with it its own reward. We hope that our visit has been instrumental in leaving some impression that will be remembered by the citizens here, and that still greater efforts will be made locally to promote all the interests of horticulture.

We thank the citizens, especially Mr. Bagby, for their drive about the country and other courtesies.

We thank the railroads for their reduced rates and other courtesies; the newspapers throughout the State for their kindly mention of our meetings, and other favors, and all others who have helped us to forward the horticultural interests of the great State of Missouri.

C. W. MURTFELD,

W. A. GARDNER,

JAMES M. IRVINE,

Committee.

REMARKS.

Mr. Goodman.—I want to say that for my part there is not a meeting that I remember of for 20 years that we ever had a better meeting than we have had here. I want to say that I have enjoyed your hospitality and your real enthusiasm.

Mr. Ewin.—I move the adoption of these resolutions by this Society. But first let me say that this has been the most pleasant gathering of its kind that I have ever attended. Especially in the feeling that has been extended toward the members of this Society on the part of these people here. I am glad to see so many boys and girls and young men and women at these meetings. It pleases me. It shows that you have an interest in things of this kind.

President Murray.—Ladies and gentlemen, I will make my speech short, but can't go away without thanking you people for the pleasant entertainment that you have given us, and those who have attended with us. I have been a member of this Society for more than 20 years, and I have never attended a meeting where the attendance at all meetings was so good as we have had here. It shows a growing interest, and I want to speak of this for a short time. We hope to have this interest all over the State. We want to enlarge our membership of this Society. We want county organizations. Take up Agriculture and Horticulture and study them. Have our boys take a course in the Horticultural work. It is a benefit to any one. Lets try to make a better showing than ever. Now I wish to thank you again for your kindness.

Mr. Evans.—I have missed but one meeting in 40 years. I don't know when I ever appreciated a thing as I have this meeting here. I never attended a meeting of this Society or any other where the house was crowded as it has been, and had such good order as we have had tonight. I say this not to flatter you, but I mean it. I want to thank you.

Judge Miller.—I can endorse every word that has been said about thanking you people. If there is any one that has enjoyed themselves more than I did, they must have had an awful good time. I do want to express my thanks for meeting here with you and being with old friends.

At the suggestion of Mr. Barnes, the audience joined in singing "America," after which the meeting was adjourned.

WINTER MEETING AT ST. JOSEPH.

December 3, 4, 5, 1901.



SOME BEAUTIFUL FOREST TREES PROPERLY THINNED OUT AGRICULTURAL COLLEGE, COLUMBIA.

WINTER MEETING.

FORTY-FOURTH ANNUAL SESSION.

St. Joseph, December 3, 4, 5, 1902.

Tuesday, December 3, 1901, 8 p. m.

Call to order by President Murray.

Invocation—Rev. A. D. Reiter.

ADDRESS OF WELCOME.

(By Major John Combs.)

Ladies and Gentlemen, members of the Missouri Horticultural Society: It is a pleasant privilege for me to extend a welcome to you. This meeting will be a help to us and to all the State. Missouri is second only to California and this northwestern part is worthy of a meeting for it is the natural home of fruit. In the '60's there were few orchards here. My father was a farmer and depended for his supply on wild fruits; for this part was well favored in them. We could gather plums, grapes, strawberries and others as plentifully as in the present orchards.

This organization ought to receive more liberal help from the State to spend in distributing information. Through the Secretary and papers we can make the the industry larger.

I bid you a hearty welcome to the city and if from what you learn you think this part worthy; come to live here and plant your fruits.

RESPONSE.

President Murray responded and after thanking Mayor Combe and the people of St. Joseph for the hearty welcome extended, told of some of the possibilities of fruit growing in Missouri. Referring in a

fitting eulogy to the two vacant chairs of the society, he spoke of the works, left behind by those now gone. Orchards all over the State give voiceless but eloquent testimony of their work and energy. "Not dead," said President Murray, "but called up higher to receive the reward of their labor." The president said that during the forty-four years of the society's existence, fruit culture has become a great industry. Then there was no such thing as commercial fruit growing in the State, and only \$20,000,000 worth of fruit produced annually in the United States; now Missouri alone produces ten to twenty-five million dollars' worth of fruit annually. We have been called the second state in quantity of fruit production; we deny taking second place in quality of our fruit, which is unexcelled. As high as \$1,200 has been made on a single acre of strawberries. In southwestern part of the State 20 acres of berries made a net profit of \$6,020.00. Orchards sold at from fifty to three hundred dollars per acre for the fruit in one season.

Some of us are willing to lay back and buy our fruit from the old worn out land in the East, or from Colorado, where they raise fruit on land costing \$150 to \$200 per acre and irrigate, and after packing and hauling thirty to forty miles to railroad then must pay five hundred dollars per car to Missouri river points; and yet those growers are making money. If they can make profit with all the expense they must have, why can't we make a fortune with cheap land and natural advantages of Missouri? Our land is unsurpassed for fruit growing. The red land of the Ozarks is unexcelled. Best of all, our cheap land is the best fruit land we have. There can be no overproduction of good fruit. The world must be supplied by a comparatively small area.

FLOWERING BULBS.

(By Mrs. T. Lee Adams, Kansas City, Mo.)

Those attending the Flower Show of Kansas City were deeply impressed with the deportment of the great crowds. As you passed in you felt the silence. The beautiful flowers, bright children of the sun seemed to be preaching cheerful, happy sermons.

They seemed to say "God weaves the robe of inimitable beauty for us who perish in a day and the people's faces seemed to respond with the thought" when the deathless soul is sent forth from its

perishable habitation, it shall be transplanted to those everlasting gardens. They received the homage of the admiring crowd without vanity and they won all hearts with the unstudied grace of simplicity, bestowing smiles of equal warmth upon all. Thus flowers seem appointed to be our comforters in all the changing scenes of life.

It is a great pleasure to be able to attend these meetings where we may compare notes, and learn to grow these silent teachers.

Nothing has so retarded human happiness as the inability of man to appreciate this world. Every great poet, every great thinker, every great moralist has urged humanity to unveil more moral beauty and to dig out of the fertile ground more mental happiness.

Lord Bacon said "why do you not develop your world? The poets all say "why do you not walk upon greener grass and among sweeter flowers?" Do your feet prefer thorns? The musicians say "why do you not weave out of life a better song?"

So let us keep up the study. Botanically speaking, a bulb is an underground stem, and though generally considered a root, partakes more of the nature of a seed.

When planted, it sends forth roots into the earth, and an ascending shoot to the upper air, as a seed does in vegetation; and as in the case of a seed, the young plant is nourished by the starchy matter contained in the bulb, in the same manner as by that stored in the seed.

The period required to perfect this process, or, in gardeners language, to make the bulb "strong enough to bloom," is widely different in different species, and even varies much in the same species according to mode of growth and favorable or unfavorable circumstances. - In all bulbs, tubers, and fleshy root-stalks, this nutriment is laid up in the earth, and the leaves mostly die annually, or take a season of rest; hence we see the pertinence and force of the old gardeners adage, "fine flowers, large leaves," as, without a full development of foliage, it is useless to expect a perfection of bloom. Were the leaves of a bulb to be cut off as fast as they appear, the bulb would perish; therefore if we would allow them their full action for the perfection of the bulb, they should never be cut off until they begin to turn brown and wither, which is a sure sign the circulation of the sap has ceased and then they will readily come away from the bulb.

Bulbs which flowers in early spring, such as crocus, Persian iris, snowdrop, tulip and hyacinth, rest from June or July until October, when their roots begin to grow; but the leaves do not appear until the next spring. Lilies go to rest immediately after flowering and

seldom grow until late in the spring, except the white lily and its varieties, which make their growth in the autumn preparatory to blooming in early spring.

As we have seen that each bulb has its season of rest, it would follow that all bulbs should, during that season, have nothing to excite their dormant powers and to urge them to growth. With most bulbs, this is afforded by taking them out of the earth, and preserving them in a perfectly dry place, or with many bulbs grown in pots by withholding water, and "drying them off."

Some hardy bulbs do better if taken from the ground as soon as they have matured their growth, and wrapped in dry paper, thus kept until the season for replanting; this, indeed, is the general practice with "Holland bulbs." Others again do better if left in the ground undisturbed for years.

Bulbs grown in water should be planted in soil as soon as the bloom fades.

As a class, bulbs are most interesting, whether we regard the facility with which they can be cultivated, or the variety, profusion and brilliancy of their flowers.

A bulb-bed can be gay every month, from early April to November, and the brilliancy of their bloom is unrivalled in the floral kingdom.

Their name is Legion, and many of the rarer species are no less curious than beautiful. A bulb case in a south window and a bulb-bed under it, will give us flowers from January to December, as we begin the year with fragrant hyacinths, and enjoy, in turn the ever welcome snowdrop, the gay crocus, the delicate iris, the gaudy tulip, scented hyacinth, brilliant narcissus, stately lilies, gladiolus, till the double Roman narcissus once again bids us a merry Christmas and a happy New Year.

The primary rule in bulb culture is, grow the foliage well. The stronger and more vigorous the leaves are, the stronger will be the bulb, and consequently, the larger and finer the bloom. The present great mart for the more common bulbs is Holland, where bulb culture is the business of many principal horticulturists, by whom the foreign market is supplied. This business has been carried on so extensively for many years that certain exotic bulbs such as tulips, hyacinths, and crocus, are generally known as "Dutch or Holland bulbs."

These bulbs are raised in such quantities, and are so cheap, that in this country it is easier to import bulbs than to raise them, so that bulbs which have flowered are usually thrown away. As a general

rule, the bulbs should be planted in October, that the roots may make a good growth before the cold weather sets in.

Bulbs should never be mixed. Let each kind be planted in a mass by itself if the full effect of each be desired. The bulbs being planted (say about the middle of October) there is nothing more to be done until the ground begins to freeze. But the bulbs are by no means idle! no sooner are they planted than they begin to grow.

A crocus or hyacinth will in a few days throw out a root an inch long, if in a moist soil. As soon as the ground begins to freeze at night, the bed should be covered with three or four inches of course litter, which will prevent the earth from freezing very deep, and thus allow the roots to grow all winter. When the covering is removed, which should be about the middle of March, the bulbs will be found to have sprouts an inch or more in length.

These, of course, will be yellow, from not having been exposed to the light: but they will soon turn green.

If the spring is dry, the bed should be occasionally watered to prevent the premature ripening of the foliage, and to encourage its growth.

As a general rule, a soil with a proportion of sand is best suited to the growth of bulbs, some even thrive in pure sand: and there are very few which will succeed in heavy close soil. A good compost for the growth of common bulbs is one part clean sand, one part leaf mold or rich garden loam, and one part well rolled manure. They should be in a sunny situation, for they are natives of countries where the sun is far hotter than ours.

Regarding ribbons, Charles Dickens sagely remarks in the Christmas Carol that they are so cheap you can make a brave show for six pence. The same thing may be said nowadays of tulips. So easily may they be procured and with such little difficulty cultivated in our gardens, that one can hardly understand how the bulb from which these gorgeous flowers spring could ever have commanded the price of precious stones, yet such was the case in the land of the Dutch in the first third of the 17th century.

The tulip, so named, it is said, from a Turkish word signifying a turban, was introduced into western Europe about the middle of the 16th century. Conrad Gesner, who claims the merit of having brought it into repute, little dreaming of the extra ordinary commotion it was to make in the world, says he first saw it in the year 1559, in a garden at Augsburg, belonging to the learned Counsellor Herwart, a man very famous in his day for his collection of rare exotics.

The bulbs were sent to this gentleman by a friend at Constant-

inople, where the flowers had long been a favorite. In the course of 10 or 11 years after this period, tulips were much sought after by the wealthy, especially in Holland and Germany. Rich people at Amsterdam sent for the bulbs direct to Constantinople and paid the most extravagant prices. The first roots planted in England were brought from Vienna in 1600. Until the year 1634 the tulips annually increased in reputation, until it was deemed a proof of bad taste in any man of fortune to be without a collection. One would suppose that there must have been some great virtue in this flower to have made it so valuable in the eyes of so prudent a people as the Dutch; but it has neither the beauty nor the perfume of the rose, hardly the beauty of the sweet pea; neither is it as enduring as either.

Many persons grow insensibly attached to that which gives them a great deal of trouble, as a mother often loves her sick and ever-failing child better than the more healthy, upon the same principle we must account for the unmerited encomia lavished upon these fragile blossoms. In 1634, the rage among the Dutch to possess them was so great that the ordinary industry of the country was neglected, and the population, even to the lowest dregs, embarked in the tulip trade. As the mania increased, prices augmented, until in the year 1635, many persons were known to invest a fortune of 100,000 florist in the purchase of forty roots. People who had been absent from Holland, and whose chance it was to return when this folly was at its maximum, were sometimes led into awkward dilemmas by their ignorance. There is an amusing instance of this kind related. A wealthy merchant, who prided himself not a little on his rare tulips, received upon one occasion a very valuable consignment of merchandise from the Levant.

Intelligence of its arrival was brought him by a sailor, who presented himself for that purpose at the counting house, among bales of goods of every description. The merchant, to reward him for his news, munificently made him a present of a fine red herring for his breakfast.

The sailor had, it appears, a great partiality for onions, and seeing a bulb very like an onion lying upon the counter of this liberal trader, and thinking it no doubt, very much out of its place among silks and velvets, he slyly seized an opportunity and slipped it into his pocket, as a relish for his breakfast.

He proceeded to the quay to eat his breakfast. Hardly was his back turned when the merchant missed his valuable *Semper Augustus*, worth 3,000 florins, or about 280 pounds sterling.

The whole establishment was instantly in an uproar; search was everywhere made for the precious root, but it was not to be found.

Great was the merchant's distress of mind. The search was resumed but again without success. At last some one thought of the sailor. The unhappy merchant sprang into the street at the bare suggestion. His alarmed household followed. The sailor, simple soul, had not thought of concealment. He was found quietly sitting on a coil of ropes masticating the last morsel of "onion."

Little did he dream that he had been eating a breakfast whose cost might have regaled a whole ship's crew for a twelve month. Anthony caused pearls to be dissolved in wine to drink the health of Cleopatra; Sir Richard Whittington was as foolishly magnificent in an entertainment to King Henry V; Sir Thomas Gresham drank a diamond dissolved in wine to the health of Queen Elizabeth when she opened the Royal Exchange; but the breakfast of the roguish Dutchman was as splendid as either. He had an advantage, too, over his wasteful predecessors; their gems did not improve the taste or the wholesomeness of their wine, while his tulip was quit delicious with his red herring. The most unfortunate part of his business for him was that he remained in prison for some months, on a charge of felony, preferred against him by the merchant.

Another story is told of an English traveller, which is scarcely less ludicrous. This gentleman, an amateur botanist, happened to see a tulip root lying in the conservatory of a wealthy Dutchman. Being ignorant of its quality, he took out his pen knife, and peeled off its coat, with the view of making experiments upon it. When it was by this means reduced to half its original size, he cut it into two equal sections, making all the time many learned remarks on the singular appearances of the unknown bulb. Suddenly the owner pounced upon him, and with fury in his eyes, asked him if he knew what he had been doing? Peeling a most extraordinary onion, replied the philosopher. Its an Admiral van der Eyck, said the Dutchman. Thank you, replied the traveller, taking out his note book to make a memorandum of the same. Are these admirals common in your country? Death and the devil, said the Dutchman, seizing the astonished man of science by the collar; come before the syndic, and you shall see. In spite of his remonstrances, the traveller was led through the street, followed by a mob. When brought into the presence of the magistrate, he learned, to his consternation, that the root upon which he had been experimenting was worth 4,000 florins; and, notwithstanding all he could urge in extenuation, he was lodged in prison until he found securities for the payment of this sum. The demands for tulips of a rare species increases so much in the year 1636, that regular marts for their sale were established on the stock exchange of the cities. Symptoms of

gambling now became for the first time apparent. Many individuals grew suddenly rich. Everyone imagined that the passion for tulips would last forever and that the wealthy from every part of the world would send to Holland, and pay whatever prices were asked. People of all grades converted their property into cash, and invested it in flowers.

At last the more prudent began to see that this folly could not last forever. Many who, for a brief season, had emerged from the humbler walks of life, were cast back into their original obscurity.

Substantial merchants were reduced almost to beggary, and many a representative of a noble line saw the fortunes of his house ruined beyond redemption.

The matter was finally referred to the Provincial Council at the Hague, and it was confidently expected that the wisdom of this body would invent some measures by which credit should be restored. The question was raised in Amsterdam, but the judges unanimously refused to interfere, on the ground that debts contracted in gambling were no debts in law. To find a remedy was beyond the power of the government.

Those who were unlucky enough to have had stores of tulips on hands at the time of the sudden reaction were left to bear their ruin as philosophically as they could; those who had made profits were allowed to keep them; but the commerce of the country suffered a severe shock, from which it was many years ere it recovered.

The example of the Dutch was imitated to some extent in England.

In the year 1636 tulips were publicly sold in the exchange of London, and the jobbers exercised themselves to the utmost to raise them to the fictitious value they had acquired in Amsterdam. In Paris also the jobbers strove to creat a tulipomania. In both cities they only partially succeeded.

However, the force of example brought the flowers into great favor and amongst a certain class of people, tulips have ever since been prized more highly than any other flowers. The Dutch are still notorious for their partiality to them, and continue to pay higher prices for them than any other people. As the rich Englishman boasts of his fine race horses or his old pictures, so does the wealthy Dutchman him of his tulips.

We would not cultivate flowers for the profit solely but for the reason we feel they have their missions and preach wonderful sermons of trust and confidence.

When the way seems dark and the promises obscure lets turn to

the flowers and as they open their buds to welcome the sun so let us pray Divine Providence to teach us to rejoice in the light of God's countenance.

Feelings of discouragement steal over us in spite of all our resolutions to resist and shake them off. They cast a shadow upon every prospect and make us dissatisfied with everything we have done and persuade us to believe we shall never do any better in the future.

All I presume know what it is to wrestle with despondency. Flowers are given us to instill hope. In naught do we see so much quiet grace and simplicity, and it should inspire us to seek, cherish and cultivate a peaceful and contented disposition. Nothing is so like heaven as to live, amid all the discord of the world, in the divine harmony of truth and love.

Then let us consider flowers;—

“Emblems of our own great resurrection,
Emblems of the bright and better land;
We feel sure the world is better for.

The garden walks where the children ran,
To smell the flowers and learn their names;
The children thought since the world began
Were never such garden walks for games.

There were tulips and asters in regular lines,
Sweet Williams and marigolds on their stalks,
Bachelor's buttons and sweet pea vines,
And box that bordered the narrow walks.

Pure white lilies stood corner-wise
From sunflowers yellow and poppies red,
And the summer pinks looked up in surprise
At the kingly hollyhocks overhead.

Morning glories and larkspur stood
Close to the neighborly daffodil;
Cabbage roses and southern wood
Roamed through the beds at their own sweet will.

Many a year has passed since then:
Grandmother's house is empty and still,
Grandmother's babies have grown to men;
And the roses grow wild o'er the window sill.

Never again shall the children meet
Under the poplars, gray and tall;
Never again shall the careless feet
Dance through the rose-leaf scented hall.

Grandmother's welcome is heard no more,
And the children are scattered far and wide;
And the world is a larger place than of yore,
But hallowed memories still abide.

And the children are better men today
For the cakes and rose leaves and garden walks,
And grandmother's welcome so far away,
And the old Sweet Williams on their stalks.

THE KITCHEN GARDEN.

(By R. A. Brown, St. Joseph, Mo.)

R. A. Brown of this city made an address on "The Kitchen Garden." Mr. Brown is an attorney by profession, but is also one of the best posted of men on gardening and intensive farming.

He said that everyone should have an asparagus bed and a strawberry bed. To grow asparagus successfully he said that one must fertilize threefold what would seem necessary.

In raising strawberries he said that one should, in the city, have new plants every year, as this method gave the best results. He said a patch of berries 40 by 80 feet in size would furnish enough berries for a common sized family.

He would grow tomatoes on a trellis and keep them growing as high as possible, new cluster of fruit forming higher as the vines grow upward.

He would advocate plenty of grapes and a few peach and pear trees in the town garden. Mr. Brown states that he has kept hothouse roses out of doors all winter in this climate by properly covering them with mulch.—St. Joseph Daily News.

MODEL ORCHARD AND HOW TO PRODUCE IT.

(By W. T. Flournoy, Marionville, Mo.)

Not many men are in the orchard business for their health, but because in many cases it proves to be a very lucrative calling. According to my idea a model or ideal orchard is one that in a reasonable length of time, by good care and management, yields to the owner a handsome profit. How to produce the model orchard or the orchard that yields the most dollars is the question that is absorbing our attention.

After the trees have been carefully selected with due regard to variety and quality and well planted, a model orchard can be produced only by proper cultivation, spraying and pruning. I cannot tell now with as much confidence as I could a few years ago, just how this work should be done, but I am more and more convinced that well directed work pays.

A line of reasoning and work that holds good one year may not be entirely right for another. We can only do the best we can to fit the circumstances; to stand still and do nothing will not do. Some one has said that "pruning is a process of thinning." I think it well expressed, for it appears to be a way we have of partly correcting the error we make in setting the trees too closely together. It seems that when a limb and its foliage become shaded that it fails to bear good fruit, and finally dies if it is not cut off before. Again when the whole area of ground is covered with trees and the branches are very thick there is not enough sunlight and plant food on area allotted to each tree. Therefore the tree must be mutilated more, so that there is not too much hungry plant there to feed.

Pruning too heavily produces as bad effects at times as does pruning too little. Just the right medium is hard to find.

To set further apart and prune less is my ideal way now, but less pruning cannot be carried out with trees set too closely.

Pruning should be done to correct unbalanced or ill-shapen trees sometimes caused by the prevailing winds. Trees out of balance must be corrected as soon as observed or wait until the next dormant season, which time we believe to be the best for this work.

The lower branches must be kept up out of the way so that cultivation may be continued until late in the season. These lower limbs that get in the way of our process of cultivation are the ones that most often drop back in vigor of growth and also produce the poorest quality of fruit. They are the ones that nature usually lets die first. Branches that rub each other must be cut out, also those branches that are over crowded, together with those commonly called water sprouts that may come out in undesirable places. The great accumulation of small limbs with foliage inside the tree should be taken out.

It is sometimes said that an old orchard outlives its usefulness. Its branches die but it continues to live and grow wood. The top branches are in the light and sunshine and live, the lower ones are shaded and die. The tree grows taller, producing more wood each year. In fact all energy is expended in growing more wood to reach more sunshine. While it's neighbor trees are doing likewise. To do this each tree has absorbed all the plant food and moisture allotted to it.

Sometimes an old tree gets its extremities very thickly covered by small and sprangled twigs that furnish a very great over-abundance of fruit buds, blooms and fruit. We have practiced cutting out with clip-pers small and interlacing branches, thereby thinning the tree of a great number of its terminal twigs, in that way lessening the amount of fruit to be pulled off.

We have seen trees stunted and injured by too much pruning even while they were yet young; have seen old trees die from the cutting off of large limbs. Often the declining line in the life of an orchard commences with some too heavy pruning that has been done with good intentions. On the other hand with more space around there is more room for expansion of branches and foliage. There is more room in the soil for the proper amount of moisture to be used or let alone as nature may demand in the proper maintenance of the tree and fruit. There is also room between the trees for handling tools and growing plants that assist nature in supplying plant food to these wide apart trees.

Another point that must not be lost sight of in the water or moisture supply in the earth in an extreme drouth, is that the greater part of the ground penetrated by the apple tree roots is often occupied by rocks, large and small, that cannot hold moisture in amount sufficient for the maintenance of plants in time of drouth and great need. Clay or loose earth being more porous is better fitted for this purpose. Some very rocky lands may grow trees as well or better than they grow other things, yet trees would likely do better in localities where there was more dirt. Some of our best fruit lands contain a great deal of rock, yet too much rock is certainly injurious, as above stated.

By spraying with fungicides during the early part of the season we have controlled or very much lessened the bad effects of the apple scab. In years of greater rainfall than this, the scab fungus appears to destroy and render so nearly useless the foliage of the trees that it falls off and the fruit is prematurely ripened and rendered more susceptible to the attack of bitter rot and other diseases, which might attack fruit that is prematurely ripened in warm weather. We find that continually weakening the amount of blue-stone used in Bordeaux mixture in dry weather where a second, third or fourth spraying may come between rains, is necessary in order to keep from burning or rusticoating the young and tender fruit in the early part of the spraying season. However, a season like the one just past has not occurred many times in the memory of fruit growers, and it is to be hoped that it will not be repeated in point of dryness. During the dry season Leaf-rollers and Canker Worms were more numerous and the continuous use of the full amount of Paris Green was adhered to for each spraying.

We had no Codling Moth during the early part of the season, but very late in July and early in August they increased apparently very rapidly until they did great damage to the finest crop of apples we had ever seen on our trees.

This damage continued until harvest time and caused many tons of what might have been first-class apples fall to the ground.

In our 90-acre orchard during this year of great damages and high prices, this crop, shortened as it was by insects, had a good value. More than could have possibly been produced in the drouth, at the same cost, by any other crop known to us. The difference in its value without damage by these late developed insects would have been enough to represent the savings of a life time of one who lives by daily wages even under the most favorable circumstances.

These insect conditions usually occurred in orchards that had heavy crops of fruit last season and were not altogether free from worms then.

"When continuous shallow cultivation is practiced without breaking up the lower strata by deeper plowing, the ground underneath the shallow cultivation often gets very hard, apparently making a good conductor for heat downward through its compact condition, while its perpendicular pores give egress to the heated moisture below.

With deeper plowing more horizontal air spaces are made, thus making a non-conductor for heat and checking the up-flow of moisture. We have been led to believe that a good plan to resist drouth is by deeper plowing or stirring, followed by rolling or dragging the ground down, followed by continuous shallow cultivation. When the ground becomes thoroughly wet and packed again, it is run tight together and may once more need deeper stirring. Deep plowing must necessarily do more damage to tree root system where trees are planted too closely. Plowing very deep near a tree and damaging roots then must be avoided."

WEDNESDAY, DEC. 4TH, 1901, 9 A. M.

Meeting called to order by N. F. Murray, President.

Invocation by Rev. M. Hunt.

Appointment of various committees by President.

Fruits—F. Holsinger, Kansas; E. J. Baxter, Illinois; Silas Wilson, Iowa.

Finance—G. T. Tippin, H. S. Wayman, F. H. Speakman.

Obituary—G. A. Atwood, J. C. Evans, F. Wellhouse.

Final Resolutions—C. H. Dutcher, G. W. Hopkins, J. M. Irvine.

Recognition of Visiting Delegates—Silas Wilson, Iowa; G. V. Fowler, Iowa; H. Augustine, Illinois; E. J. Baxter, Illinois; F. Holsinger, Kansas; W. H. Barnes, Kansas; Geo. Holsinger, Kansas; W. Perkins, Kansas; F. Wellhouse, Kansas; Prof. Emerson, Nebraska; Mr. Walker, Kansas; Mr. Wheeler, Kansas; Mr. Brazelton, Walthena, Kansas; G. F. Espenlaub, Kansas; G. A. Marshall, Nebraska.

Princeton, Ill., Nov. 30, 1901.

To the Officers and Members of the Missouri State Horticultural Society:

Gentlemen:—This will introduce to you, Mr. H. Augustine, of Normal, Ill., a duly authorized delegate from the Illinois State Horticultural Society, to your annual meeting for 1901.

Mr. Augustine is probably well known to the most of your members as an old and valued member of our society, and connected officially with it for many years, and I trust that his attendance at your meeting will be mutually profitable. Yours truly,

L. R. BRYANT, Secretary.

To all to Whom These Presents May Come, Greeting:

Know ye, that reposing special confidence in Hon. Silas Wilson, of Atlantic, I. M. J. Wragg, by virtue of the authority in me vested, do hereby appoint and commission him a delegate to represent the Iowa State Horticultural Society at a meeting of the Missouri State Horticultural Society convened at St. Joseph, on December 3-5, 1901.

Dated this eleventh day of November, 1901.

M. J. WRAGG, President,
Des Moines, Iowa.

Attest:

WESLEY GREENE, Secretary.

WHAT I HAVE ACCOMPLISHED ON FIVE ACRES.

(By C. W. Halliburton, Moberly, Mo.)

Mr. President, Ladies and Gentlemen:

On the 15th of November I received a letter from our worthy secretary asking me to prepare for this meeting a paper on the apple orchard, and I most respectfully declined. My reasons for so doing are, that I had never grown a commercial apple orchard to bearing size and I did not feel equal to the occasion. However, I promised a short paper on the subject as indicated above.

Two years ago I prepared a paper on the above subject and read it before our county society. What suggested this subject to my mind was that in my travels through our and adjoining counties my calling (that of a nurseryman) brought me in contact with men that owned small farms or tracts of land and they frequently said, "If I had more land would plant an orchard," and as I said and do say, "Those are the men to plant trees," for, what will bring the returns that five acres planted in fruit will? My home place consists of five acres located in the corporate limits of east Moberly. I commenced seven years ago to plant fruit and will give you a brief outline of what I have accomplished. I have planted about 80 apples, 250 pears, 200 cherries, 200 peach, 100 plum, 500 raspberries, 400 gooseberries, 100 currants, 200 grapes, and about 2 acres in strawberries, besides various other vines and shrubs. I have still a small space of ground yet unplanted, and have ample lawn and barn lot. My wife says she thinks when I plant the remaining ground that I will "jack up" the house and plant where it now stands. You may wonder how I have succeeded in planting so much fruit on so small an acreage. I plant my raspberries and gooseberries in my tree rows and the spaces between I place strawberries. I have grown strawberries successfully for five years in this manner among my cherries, plum and apple trees. Of course a great deal of fertilizer must be used. I have planted Standard Keifer pears on my poorest ground and have never put a knife to them except to remove water sprouts.

My first plantings are now in bearing and have borne four successive crops. The one of 1900 was sold for an amount equal to the cost of the ground, which was \$140 per acre, and this year's was equally as good in revenue, but not in quality. The money makers for me have been the Early Richmond and Late Duke in cherries, Keifer and Duchess

in pears, Wild Goose in plum, Crescent Seedling in strawberries, Down-in in gooseberries, Mammoth Cluster in raspberries and Fay's Prolific in currants.

Now in conclusion I will say to those that are not "possessed of broad acres" and must be content with from 5 to 40 acres, by all means plant a part in fruit, and if anyone is looking for a regular job lasting the year around plant 5 acres in small fruit.

SUCCESS AND FAILURE IN APPLE GROWING.

(By Wm. P. Keith, Mayview, Mo.)

Mr. Chairman and Members of the Missouri State Horticultural Society:

In trying to discuss the subject of "Success and Failure in Apple Growing" I do not for a moment think that I can present anything new to you men who have grown old in the profession of horticulture, nor do I hope to be able to point a way to a certain success, for I am fully aware that the most successful growers have often met with sore disappointment and failure; for without failure we cannot rightly appreciate success. But if I can be able to show some beginner a sure way to failure, and he may be thereby induced to steer clear of the shoals where so many have stranded, and where others are struggling in the breakers of financial disappointment, my end will be attained.

It is of the first importance that the man who plants an orchard should know something about the necessary kind of soil required by an apple tree of the kind he wants to plant and whether or not the particular kind of apple he fancies will do well, and produce a good crop.

These preliminaries satisfactorily settled, he will decide how far apart he will put the trees in the row; and the number of rows in the ground he wants to plant being ascertained, multiplying one by the other will give the number of trees required; go to some reliable nurseryman and buy his best trees, if you have to pay a good deal more for them than you would for inferior stock. The excess will be money well spent.

The majority of people prefer planting two-year-old trees, but my experience, and that of several of my neighbors who have planted large orchards in the strong prairie soil of Lafayette county, Missouri, is that a three-year-old tree starts off better, is more apt to live through a drouth, and will come in bearing before the two-year-olds. The soil may have something to do with it, or the tree being larger and stronger may be able to stand the transplanting better. Which is it, or have both causes something to do with it?

What is the best soil for an orchard?

I would answer: The soil that will grow good corn, wheat, oats, hemp, potatoes, etc., will grow good apples if the trees are properly planted and cared for; but do not plant "spouty" or wet land to trees, even if it is tile drained. Your trees may grow all right for a few years, but when they get to bearing age they are apt to die or produce worthless fruit.

Young trees should not be planted much deeper in the orchard than they grew in the nursery row. Spread the roots out well, jolting the tree lightly up and down while covering the roots; leave no hollow place under the tree; tramp the earth well over the roots; thin out all cross limbs; cut the head back a little if you prefer; wash the body of the tree with strong soap-suds; put on a wooden wrapper and you will have but little else to do but keep the ground clean the first year.

The second year you must get the head in proper shape. I don't believe in using the pruning knife very much. If the trees are gone over in May and June and the buds rubbed off where you don't want a limb to grow, very little pruning will be required. Keep that up for five years, and your orchard will need little more attention so far as pruning is concerned, and if you have kept the borers out, you can reasonably expect to be soon rewarded with a crop of fine fruit.

But I think I hear someone say: "What about the bugs?" You have not said a word about them. No, I did not think it necessary to say anything about them to a man who cares for his trees as above indicated. You will find him up to date in the bug and fungus line. He will take no chances, and will apply the different solutions at the proper time, and be rewarded with a full crop of fruit which will sell at a good price.

If I am not wearying you, let us look for a while at the orchard that is a sure failure.

Mr. C., who has been in the cattle business, has met with some heavy losses. He has just heard that Mr. A. has sold the apples on that young orchard of his for over one hundred dollars per acre, concludes it must be a good thing, orders a car load of trees, has his ground plowed and harrowed, runs a deep furrow with a lister both ways, employs a force of hands who in all probability never planted a tree before; starts them planting where the furrows cross; two men working together and probably racing to see who can get to the end of the row first; some of the trees with a good portion of the roots uncovered, and others put in the ground six or eight inches too deep. The result is, of course, that a great many trees die the first year. The cultivation they receive is on a par with the planting, and the care

given them is no better than the cultivation: the borers attack a great many which soon grow weak and die; some replanting is done about the second or third year, which receives little or no attention, and about the fourth spring from the first planting the whole orchard is sown in clover; it may or may not be mowed. Hogs and cattle, in all probability, are turned in to eat the clover and do all the future cultivation and pruning. The shade under the best trees affords an inviting place for the hogs to root great holes to sleep in during the hot weather. The hogs in rooting expose and peel the bark off a great many of the principal tree roots. When fall and winter come these hog beds get full of water which freezes around the exposed roots, and the next spring those trees will show signs of decay, and will soon be dead.

Thus he struggles along until the orchard is eight, ten or twelve years old. Mr. C. has been looking for thousands of barrels of apples every year, but finds nothing but wormy stuff that no one will buy. All the apple buyers advise him to spray his trees, and he would have better fruit, but he won't do it, for "no one but a crank will spray," and he says, "There may be no Codling Moth next year." But the Codling Moth continues to increase, reinforced by the bud Aphis or small green louse. Canker worm, bud worm, Bombycid caterpillars of various kinds, Black Rot or Bitter Rot, Apple Scab and scores of other insect pests and fungus diseases, until his orchard is a veritable hatchery for every species of insect and fungus pest, to the almost total destruction of his own fruit and of great injury to his neighbors. He concludes there may be something in spraying, and he goes to one of his neighbors who is crank enough to spray every year, and begs "a one gallon can full of spray solution" to thoroughly test the benefits of spraying in a ten thousand tree orchard. He empties the can on one tree and declares the apples were as wormy on that tree as on the others, and is now thoroughly convinced that there is no merit in spraying.

Thus many orchards are growing today, without any care, the owners looking in vain for large returns they have no right to expect, for if an apple tree does not get proper care at the proper time, we have no more right to expect a good crop of sound merchantable fruit, than we would have to expect a good crop of corn by planting the seed and giving it no further attention or cultivation. Thus we see by neglecting to take proper care of our trees at the proper time, failure is absolutely sure.

I hope this meeting will not adjourn until some action has been taken looking to the control of insect pests through legislative enact-

ment, and the requirement, by law, of a guaranteed strength or purity of all insecticides offered for sale in the market.

Discussion.

President Murray.—Now ladies and gentlemen these two papers are before the house for discussion, and we want to include in this discussion the excellent paper read last night by Mrs. Fournoy, on the model orchard.

Professor Howard.—Referring to the paper that was read last night, I believe the reader gave it as her opinion that it was best to plow deeply in the spring and then cultivate shallow all summer. I should like to hear expressions from the members regarding that opinion.

Mr. Baxter of Illinois.—There is only one time that I have advised plowing deep and that was before you planted your trees. I advise sub-soiling thoroughly in the fall and after that I would not plow deep in the orchard. I think the proper time to plow deep is before the orchard is planted; sub-soil well and let that be enough. After that keep the surface of the soil continually soft, and you will not be troubled.

President Murray.—There is one point that I want to be brought out clear and distinct, whether or not it is a good thing to break the roots of apple trees. We have had some reports about this, and this matter is now before you and let us hear from you. You have all had your experiences and this is an experience meeting.

Mr. Jones.—I can relate an experience of some deep plowing in an old orchard. An orchard that was 29 years of age and had been neglected. It had been cultivated like one of the parties spoke of by sowing it to clover and timothy and the trees greatly neglected; most of the trees were Rome Beauty apples and some other varieties; probably twenty-five or thirty other varieties of one or two trees of a kind, and it was thought that this orchard was of no further use and they broke up that sod with one of these big plows that they use in Illinois for plowing under sod, not a regular Kansas sod plow, but a large plow with a rolling coulter and it seemed that the first year those trees would almost die; a great many roots were cut, and they seemed to make scarcely any growth. The next year that orchard was well cultivated with a harrow and disc harrow and such a growth as it put on was a marvel, and the third year such a crop of fruit as it had was a wonder. Those old trees seemed as though they had retained all their early vigor, and there were plenty of those trees that would yield from 20 to 30 bushels to the tree, because they had the size and the age; they were then 29 years of age, and while I would not advise

that—that simply came under my observation and I saw all the particulars of the work. I am satisfied that there were roots that were cut in that orchard when it was first plowed under, of an inch and a half in diameter, and whether it would be a good thing to advise that I could not say, but that is simply an actual observation.

President Murray.—I would like to hear from the men who sell their orchards for from ten to twenty-five and thirty-five thousand dollars. Judge Wellhouse, the apple king of Kansas is before us. If he is willing to let us know the secret of his wonderful success, we would like to hear from him, and we would like to know whether he cuts the roots of the apple trees or not.

Judge Wellhouse.—Mr. Chairman: I don't know that my opinion upon deep plowing is any good for I have never done any of it. When we plant our trees we plant them in trenches, and when we plant them we use a lister disc with four horses hitched to it, and we run that lister with the sub-soil attachment to it, and that is about all we have done. We have done some deep plowing on a small scale and sub-soiling, but we have seen no benefits derived from it, and I have come to the conclusion that it depends almost entirely on the character of the soil. I believe that is the secret of the success and failure of deep plowing and the other plowing. It depends almost exclusively on the character of the soil.

Now Mr. Munger of Greenwood county, Kansas, has a 400-acre orchard and has done more experimenting in sub-soiling than any man that I know of in Kansas, and he says that our theorists are talking all the time about sub-soiling and have been advocating its use for years (and the Kansas City implement houses have sub-soil plows there and have had them there for years)—he says it takes about a two-horse wagon to haul all the sub-soil plows used in Kansas today, and that we have got enough results from our mode of doing, and that he doesn't pay any attention to it. If you want to get thorough information on sub-soiling, you will have to go to men who have benefited by it.

We make our living by growing apples. Some of you, perhaps, have heard some glowing accounts about our success. Now if we have had any success it is largely owing to our failures. It is often claimed that the man who has never had any failures is no good, and when a failure does come it upsets him, but the prudent man that has had continual failures, if he stands through those failures he will eventually succeed.

Well, now there is Mr. Murtfeldt. He has been in the horticultural business for a long number of years, and he is anxious to

know something about my success. Now I will tell you that I have heard men talking since I came here that have had five times the success I have had. We have been planting trees and planting trees, and we have got a large number of trees, and of course grow a good many apples, but when we come to count the number of trees per acre, it doesn't amount to half as much as what some of you grow. I will venture to say there are a dozen men in this audience that have had better success than we have, and nobody says a word about it.

Now in counting up our fruit, of course we have to keep count for every cent we pay out and every cent we take in, and every bushel we grow, and I find, in looking over our books, that our first crop we grew on an eighty, and we have been growing apples ever since, and have had one total failure in twenty-five years. And yet, I find that our trees have averaged a little over 50 bushels per acre. In twenty-three years we have grown some 451,000 bushels, I think, or about that, and in counting right up with the number of acres, I find it has averaged about 50 bushels an acre.

Some of you perhaps know a good deal about deep plowing. We have succeeded in making a living in the last twenty-years we have grown apples, and we are satisfied with that, but we have not come up to as many bushels per acre as some of these other men. I was just talking last evening here with a gentleman from Wathena that beats me all to pieces. He had his apples out there on the corner of that table, and you just ought to look at them and talk to him. He can tell you more about growing apples profitably than I can, and I have no doubt that Major Holsinger has got some equally as good, and that there are others present here who can tell you more about it and who have had more experience in all kinds of fruit than I have had.

I started out with the theory that a man ought to measure his own abilities and to confine himself to about that means. If he thinks he is capable of doing a whole lot of things he is not always able to do it. I started out thinking that I ought to be able to raise Ben Davis apples, and I went at it, and I have made a good living, and some of these other men—these young fellows—have raised dozens and dozens of varieties and all kinds of fruit, and I could not do it. I am giving all of my attention to growing apples and only three or four varieties of them, and I haven't a bit of doubt that I have had more failures—I could tell you more about our failures than I could our successes—a good deal more.

This last year has been a remarkable year. I have learned more lessons in the last year, than I have in any other one year since I have

been growing fruit. If I remember, last spring the soil was full of moisture. Our trees bloomed out in fine shape, and the fruit set well, and then all at once it commenced to get dry, and it got drier and drier, and the first of August we began to get some rain, and by that time, I think I am safe in asserting that our winter varieties of apples were not over one-half, possibly three-fourths, of an inch in diameter. I question whether they would average that. I think you Missourians will bear me out in the statement that our winter varieties of apples would not average three-quarters of an inch in diameter on the first day of August. Then they commenced to grow and they grew and grew, and look at the fruit here now! Such a collection of fruit I have never seen at any horticultural meeting since I remember.

Now what made those apples grow so rapidly after the first of the month? We have often had seasons when we had more rain than we have had since the first of August and the fruit didn't grow half so well. Peaches on the first day of August were shriveled up. It was so in our state and I think so in Missouri. They were shriveled up and looked as though they would not be worth picking. In September, I never saw such specimens as there were on the market. In your State here, I have heard there was a remarkable yield of peaches in the Ozarks. We have had the finest peaches in our market that we had for a number of years. Now why was that? There is some cause for it. There is some cause for the wonderful growth of these apples. There is some cause for the immense yield of peaches. Have we all considered what that was, after having such a drouth as we had this summer, that we had such a remarkable growth from August up to October? Now my opinion is that it was all owing to that drouth. My opinion is, that drouths are a benefit. That seems like an absurd assertion, but my opinion is that drouths not only help, but they are a necessity.

But why? Why is a drouth necessary? For this reason. All plants require a certain amount of mineral. All plants I say. I don't know of an exception. The ground is full of these minerals, but they are not all in solution, and if they are in solution they are not near enough the surface to be affected. But when we have an abundance of rain those minerals that are in a solid condition are carried beneath the earth. Water, as we discovered last summer, is a very essential thing. We fruit growers as well as every one else know that. If you will examine it closely you will find that water is nothing but a carrier, at least its mission is to carry material needed for plant growth. Now, when we have pleasant, warm weather the scientists say that the evaporation, where there is water available, will average one-half of that

substance in the water. That the water is carried in the atmosphere and is held in suspension in the atmosphere until precipitated by our rains, and when it does rain we understand that the vegetable growth that is decayed, and all over the surface of the earth where vegetables grow there is a constant decay of vegetation, and the gases arising from that vegetation return into the air and are held there as gases. When we have a rain, the rain having more attraction for those gases than the air does, it gathers them up and they are carried into the earth, and when carried into the earth, the earth having a greater attraction for these gases than the water has, it takes them up. Then when the water seeps into the earth, the gases immediately begin to load up with minerals. That is, the minerals in the earth that are in solid condition are attracted by the water and carried down into the earth by that water. Now, that brings this application that I tell you of the moisture; the rain has absorbed all the minerals that it can hold, or as much of them as it can reach, and they are held in the earth at different depths; sometimes near the surface and sometimes a way down. Well, now, while we have plenty of minerals at the surface, they are not affected, because they are not in soluble condition. They are not in condition to be used by plants, but here is this moisture way down in the earth that is loaded with these minerals that are necessary for plant growth, and when we have the dry weather that we had this summer the heat begins to have an attraction, and that moisture is drawn from an immense depth below the surface to the surface, and when that water is brought to the surface and evaporates, there is not one particle of that mineral element that is carried off by this evaporation. It is all left at the surface of the earth, and hence, when we get a shower of rain after the drouth, the remarkable growth of vegetation.

Now we know the results of this on this year's growth, and my opinion is, that it is largely owing to this fact that the moisture has drawn these minerals to the surface and made them available. Did you ever see a season after a severe drouth that we didn't have good crops? I don't remember of a time after we have had a severe drouth, but what we have had especially good years in the succeeding years for good crop growth. Now am I right in this? These are my reasons why I think drouths are necessary.

Mr. Murray.—I am one of those that have had failures and successes both. I was very much interested in that paper read by Mrs. Flournoy last night, and I am inclined very much to the idea that plowing an orchard is all right, and not being so awfully afraid to break the roots, too. The first orchard I planted is 20 miles above this city. That

was in 1870. I cultivated it continually and have only missed two years in twenty. I never had a failure. My sons who are present here and I, at the present time, have apple orchards showing a better growth than that old apple orchard, that have not been cultivated so much—been in clover of late years, and they have not borne half so much.

I will state there is something in the root pruning, but just how much and when to do it and where to stop are questions to be considered, but I think you are safe in breaking the roots of the orchards more or less. Of course it would be owing to the location and the soil and all those things.

Mr. Tippin.—Mr. President, ladies and gentlemen: I do want a word and that is simply to impress one point that was brought out in the discussion by Mr. Wellhouse and the paper read by Mrs. Flournoy, and I wish to state that, inasmuch as a good many of you didn't hear that paper distinctly, that in that paper they strike the key note, which brings us down to this point, that successful orchard growing depends on good common sense, applied to the conditions as we find them. In that paper they stated that each year brought us face to face with new conditions, with which we had to contend as they presented themselves. That is a fact that we should not forget. And that the treatment of an orchard depended entirely upon the soil and conditions in which it was planted, and I want to impress on you that the most important thing to know in successful apple growing is to know your soil and the conditions with which you are surrounded, and you cannot apply the successes of one individual or one part of the State to some other part of the State every time with perfect success, and the only way for you to succeed, and I think I speak advisedly, having been in close contact with the majority of the orchards of Southern Missouri for the past four years and especially this year of drouth, that you will have to study thoroughly for yourself and take for example those successes the nearest to you. Starting from that, studying your business closely, you will succeed.

Now as to the cultivation. This year has been one of varied conditions and varied experiences, and many times during the last three months we have seen a statement of that matter by our friend, Major Holsinger. I remember of hearing him say that a good many years ago he thought he knew all about horticulture and fruit growing, and that last year he stated he didn't think he knew anything about it. And this year of varied experiences we found by close study of the conditions, that this season, the preponderance of testimony was largely in favor of cultivation. I have found that the greatest trouble is for our people to arrive at what we mean by cultivation. One man wishes

to sell his apples and we enquire the condition of his apples and if he has cultivated it and so on, and he says, thoroughly, and we go and examine it and what do we find? We find that he has turned it with a turning plow in the spring, and we find that is what he calls cultivation, and I believe more people are in error on this point than any other one. They don't really comprehend what is meant by cultivation.

If I was going to explain it myself, I would say thorough cultivation. The best orchard we packed this year was one that was thoroughly cultivated, and is nearly always cultivated with shallow cultivation; that is with cultivators or disc harrows or something of that kind. I agree with Mrs. Flourney in her paper, on deep cultivation, if we run up against a season like this, in the middle of the row. Mr. Wellhouse agrees with that proposition because he gave you the key note when he said that these minerals were brought up by the evaporation of moisture from below. This brings us to the comprehension of the fact, that everything we can do to husband moisture we ought to do, if we expect to succeed, and I am quite proud of the facts that have been brought out by those who have read the papers and discussed them on this line, because to my mind this is the key note to success.

Professor Smith, of Chillicothe.—I want to know how to cultivate. I want to know whether to cultivate the orchard with a disc cultivator, or to cultivate it only with a disc harrow, or whether to plow it up with a breaking plow. I will tell you what I did last year. I had sixty acres in one orchard and we plowed it diagonally a year ago; we had been plowing it north and south, and east and west and concluded to plow it diagonally. We planted 20 acres of that in corn last year. The next to that we sowed in sorghum and the next lay idle. The part that was idle was broken up last fall again. The part that was in corn was not broken up. Now we put in a two horse cultivator on the part that had been in weeds and also on the part that had been in sorghum and a little in the corn—very little. I find this year in marketing the apples, that the apples were fifty per cent. better where we had broken it up in the fall and disced it with a disc harrow in the spring and plowed it all summer with the cultivator; fifty per cent. better than anything I had except where I had it well cultivated with a cultivator all last summer and raised a little corn, although not very much corn; but the part of the field, and that diagonally through it and exactly the same conditions, the same planting and with the same mode of cultivation otherwise—where it was not broken with that breaking plow—was not as good as the other by fifty per cent. Then we had another piece where it was right on top of a hill, where it had been turned to the trees too much, and a man went last March and this spring and turned

it away from the trees, and went down deep and even broke some roots—now that was a six year old orchard—and on that we had the largest, finest apples that we have had, and it has been plowed with a plow and cultivated with a cultivator every year since it was planted, and we had some enormously large apples for six-year-old trees, and the trees on a few acres of that place paid for the ground they stood on. Now that is one of these young men stories. I say that for the benefit of Judge Wellhouse.

Now I want to know whether to break it up with a breaking plow or use the disc.

President Murray.—If you mean that the best part of your story is true, I would say break it with a breaking plow and keep on.

Colonel Evans.—You made one remark that impressed me and I would like to have that impressed on every fruit grower here. He says he plowed it with a plow and cultivated it with a cultivator and cultivated it every year. That is, for the six years. Now keep that up for ever and that is good for it; that is all right. But, if you leave off your plowing for three or four years until the surface gets filled up with roots, and then put your big plow in and do it all at once you will damage your orchard, but then as long as you keep those roots down below, there you can cultivate the surface just as much as you please. I want to say this: One word answers the question of the management of an orchard, thorough cultivation.

Mr. Robnett.—I never exactly ruined my orchard, but I had a neighbor of mine that had 700 trees that he ruined. When he bought the orchard, the man from whom he purchased had taken good care of it and it seemed all right, and when this man came along he plowed the orchard and plowed up the roots. He cut them all off, and I never saw such a crop of Ben Davis apples in my life as he got from that orchard the next year, and that has been six years ago and he has never got an apple since. He ruined his trees. He ruined his apple orchard from that time to this. Now the possibilities are if he had gone on and kept cultivating, it would have been all right, but he plowed it only the one time. Mr. Tippin said thorough cultivation. I think you can get it closer than that. I say intense cultivation. Plow it every time it rains and run the ground together to get something over it.

Major Robinson.—I was reminded while Colonel Evans was speaking that we are certain of nothing, except nothing is certain. In my experience in orcharding, I had an orchard that had been run down, had been rented to one party five years who had given it very little attention. The orchard had given me no returns during that period or very little. I was somewhat disgusted with it and didn't care whether

school kept or not. I hired a man and put him into that orchard with a turning plow and told him to go down in that orchard as deep as he could. He went down about fourteen inches and he turned it upside down. What was the result? The following year I had the best crop of apples that I ever had in my life. That orchard is in good condition today, and is the best orchard I have. It was planted in 1876. Those roots were torn all to pieces, and the result was that we had a good crop of apples the two following seasons.

Now I saw some damage, but I saw a great deal of benefit from that method of plowing. And why? Because it formed new roots and formed new conditions. The roots absolutely covered the ground; when we were done we harrowed it over and harrowed it down. I believe there is nothing like tearing things.

Mr. Speakman, Neosho, Mo.—Mr. Chairman: I don't know that I can give anything that will be of any benefit to the society, but I will say that it is my opinion from the cultivation of orchards in Southwest Missouri that it is best to plow to a reasonable depth and cultivate to a reasonable depth. Of course it must be watched that the ground is not kept bared too much. It is necessary to have cover for it a portion of the time at least, but I am emphatic in saying that a good reasonable depth of cultivation—of plowing and of cultivation—is the best.

Mr. Irvine, St. Joseph, Mo.—There is a question that a gentleman who intended to be here, but is not here, asked me to bring up before this meeting, and that he wanted discussed under this head. Now this gentleman owns an orchard along these Missouri river hills, and he believes in cultivation, but his orchard is more or less steep and he is afraid if he gives the thorough cultivation that is recommended, his soil will wash too much. What would you do where you had an orchard of this character along the Missouri river hills, where the soil is very porous and washes very easily?

Mr. Tippin.—As I know of a case of that kind, perhaps it would be well to state it. A gentleman in Southern Missouri in the mountains, who has been successful in raising an orchard on very steep land, until it is now 8 or 9 year old, and has suffered very little from washing—and he has a splendid growth of his trees and has almost a perfect stand—has done it by breaking it up in the spring and sowing it in cow peas every year broad cast. He mows the peas off, taking off much hay later in the season. In that way he cultivates his land, builds it up and saves it from washing, and I believe it would be a good line of policy, for the gentleman who has presented the question to follow in the Missouri hills.

Mr. Irvine.—How will he cultivate cow peas broad cast?

Mr. Tippin.—That was the cultivation. The plowing of the soil and the preparation of it for the cow peas, and those of you that have grown cow peas know that the ground never becomes hard or packed where cow peas are grown.

Mr. Augustine of Illinois.—I came here from Illinois, and I want to learn and I appreciate your time is very valuable, but I am so intensely interested in this subject of subsoiling for an orchard and cultivating an orchard that I must say a word. In planting an orchard I feel that the most important thing to do is to thoroughly subsoil the ground, and I will say right here that from my experience and observation, I would not plant an orchard without first subsoiling the ground. By subsoiling I don't mean trench plowing. I mean shallow plowing, and then lift up your soil so that at any time the moisture will go right down—the water will go down and be stored away for future use. If an orchard has been planted for any length of time, as Colonel Evans said there on the platform, I would not think of deep plowing. I don't believe in it. Now in soil like that of Central Illinois or like Missouri and Northern Illinois, it would not do much hurt, because your trees are growing so rapidly. We have too much growth. In that case you won't hurt the orchard very much by deep plowing and root pruning, but on the other hand, such soil as you have in the Southern part of this State and as Judge Wellhouse has in Kansas, the uplands, I mean, I would certainly be very much opposed to deep plowing after the orchard has once been established without deep plowing. Now there is soil that don't need this subsoiling. For instance in Judge Wellhouse's state, you take the Kaw River Valley and I would not give five cents for subsoiling, because the soil is very porous and the moisture will go down anyhow, but on all of the uplands of Kansas and on most of our lands in Missouri and in Illinois, as I understand it, I do believe that there is nothing more valuable than subsoiling. In fact I believe it will be valuable in the cultivation of our other crops.

Mr. Long.—I would like to ask Judge Wellhouse a question in reference to the cultivation of young orchards. If he believes in subsoiling how many inches he takes to cultivate, and if it is possible to cultivate without breaking the roots, and I would like to ask you, Mr. President, if you believe in cultivation and how large a root you break?

Judge Wellhouse.—We plow about five inches deep. I think we run a subsoil lister in the furrow where we plant, and then we plant the space between the rows usually in corn, and we lease the land out between the rows to tenants and they cultivate it in corn, and we cultivate the tree rows ourselves. We have an expert that we trust to plowing the trees. We recommend five inches as the depth of the plow-

ing, and of course the first four or five years the roots don't reach out enough for the tenants to cut many roots. After our trees get to bearing we want to keep everything on the ground that we can get there and leave the leaves on the trees. The growth of the clover, the growth of the weeds, the sun flowers that grow, and sometimes they grow as high as the trees, they make just lots of mulch, and mulch is one of the best things we have, after the trees come into bearing, and then leave the surface roots alone.

Mrs. Good.—I have an orchard that is five years old. It is 30 miles east of here, near King City. The first three years I kept it in corn. Then two years I had it in red clover, and the first year that I had it in clover—the first crop I didn't let stand. I cut it for hay. The second crop I let stand. This last spring I cut the first crop for hay. It is unnecessary to say that there was nothing to cut later for seed. Now I have engaged a man to plow that under this fall with the understanding that he is to put it in corn next year. Now those trees are 30 by 32 feet apart, and I want to know how many rows of corn he can put in there. I have told him that he could put in four, not over five rows of corn. Will that make it too close? That will be about four feet away from the trees. Will that throw the corn any too close, and how many inches, how close up to the tree and how deep can they plow right up to the tree. Would five inches be too deep, and in plowing four or five feet from the tree is there any danger of injuring the roots of the tree?

Secretary Goodman.—I would like to answer partly some of these questions, because we are confronted with the same problem ourselves. I cultivate or try to cultivate my orchard at least every two years with a turning plow; much of the ground I plow every year during the winter. Some of it I plow all winter long. In the case that the lady speaks of, I should plow that ground up to within four feet of the trees at least four inches deep. From four feet from the tree, on up as close to the tree as I could get, I would run just as shallow as I could turn even if only two inches and not break any more than possible. The next four feet, I would not object to going down 6 or 8 inches, and then plant the corn within four feet of the trees and plow thoroughly all summer and you will get good results.

President Murray.—I will try to answer Mr. Long's question, in which he asked me how to cultivate. The orchard I spoke of awhile ago, I plowed with a turning plow every three or four years, and used a common corn cultivator. Now that is the orchard I spoke of several times as having borne fruit every year with scarcely an exception. We

never had a total failure in twenty years. The largest crop sold for \$200 an acre. I never had an orchard since that that made as good a record, because I have not been treating them the same way. So, I think in passing this that you have observed that experiences given here, are certainly in favor of a reasonable amount of root plowing.

RENEWING OLD ORCHARDS.

(By J. J. Bartram, Maryville.)

My observations thus far have been that whenever it becomes necessary to renew an orchard, the first thing to be done is to thoroughly prepare the soil, which must be done by cultivation, for if trees are transplanted in grass land the surface soon becomes baked hard and dry, or if weeds are allowed to grow, the trees will be of feeble growth; consequently the fruit will partake of the same feeble nature, for feeble trees bear feeble fruit; therefore, we readily see that cultivation will not only change size, but quality as well; therefore, I say thoroughly cultivate. You will be doubly repaid, both in quantity, quality and price. Cultivation is of vast importance, is not finished in a day, but requires years of steady work to accomplish what is necessary for the upbuilding or renewing of orchards.

Many trees are transplanted every year in all parts of the country, which die. I may safely say, that this is caused by or from neglect to after-culture more than from all other causes put together. The soil and climate affords unequaled facilities for fruit culture. The treasure lies within our reach in horticultural productions, and this lesson suggests to us to plant or renew without hesitation. The management should be done with intelligence, in assorting and planting or replanting, as the case may be, and every owner of land may have fruit at his own door and for his own table in which he incurs little or no risk, because he can easily plant a fruit tree in his yard or garden, or along his fence, which will grow and bear for many years: he does not even miss the ground on which it stands, and in cultivating the trees keep down all weeds, and the farm yard presents a cheerful and pleasing appearance. Then, too, it becomes a very important means of economy which produces not only fruit, but aids to soften the bleakness of winter, and gives shade in the hot summer. Many new and large orchards (mainly apples) have been planted, many have been renewed, and will amply repay for all the time labor and expense that has accrued, but in this peculiar season of drought I notice some fruits are nearly wiped out of existence caused by the extreme heat and the work of insects which they had to undergo made life hard to endure.

Now what is to be done to recover such an irreparable loss which is so discouraging. Necessarily we must renew; the sooner this is done the sooner we shall have surmounted these difficulties. Oftentimes we see very rapid growths that give excellent fruit products, and old trees can and will rebuild by proper care and attention. First rub off the old rough bark and then apply a wash made of assafoetida dissolved in milk, thickened with lime and sulphur; also wash all the large limbs, and repeat the wash on the bodies, as the rain may wash it off. Then cultivate by spading and hoeing close up to the trees. Scatter old rotted manure thickly on the ground. Nothing for general use is equal to stable manure. It gives the most satisfactory results. Leached ashes prove very successful. Plowing with repeated harrowing will give excellent fruits. If the ground is heavily set in blue grass or timothy, plow it all under shallow, but close up to the trees; use a disc harrow, and thoroughly pulverize the soil, and to encourage cultivation plant pumpkins the first two years, then sow to buckwheat or clover, which will help to rebuild the ground and make a good mulching; replant if any have died and secure them from danger of any kind. Next to good cultivation, nothing contributes more to bring out the excellent qualities of fruit and to give a handsome appearance than the attention to thinning out; fruit will be larger and of a finer flavor. Whenever it becomes necessary to replant, the young trees are dug from the ground, any bruised roots should be removed, the tree then transplanted with much care.

Can man fail to enjoy a beautiful orchard? The blooming or loaded trees, the work of his own hand, who has carefully sought what and where to plant, prune and cultivate. The home work should not be neglected, because so great good can be realized from such small efforts. What abundant success soon follows! Then are we not doubly repaid for renewing our orchards?

VARIETIES OF APPLES—GOOD, BAD AND INDIFFERENT.

(By G. P. Turner, Meadville, Mo.)

In planting an orchard the variety of fruit planted is of immense importance. One may have an ideal site for an orchard, may select his trees with great care, may cultivate and care for them according to the most approved methods, but if the variety is not a proper one or one not adapted to his special market, all of his time and labor are worse than wasted. No doubt, many such experiences have come under the

observation of every member of this Society on a larger or smaller scale. I have in mind the case of a man who now buys his trees of me. A few years ago the home nursery was too small a concern for him. He imagined that the proprietor was behind the times; that there were up-to-date methods of propagation of which that benighted gentleman had never heard. My friend, moreover, had a large heart, a large head and a large pocket-book. In fact, there was nothing small or "clinchy" about him, so when the representative of one of our large nurseries came along, the combination was complete and of course business was transacted. Said representative sold him enough trees of Ben Davis, so called, to plant about ten acres. The price was what most of us would call exorbitant, but my friend of the large dimensions believed thoroughly in sacrificing means to gain ends, and so no words were bandied about the price. The trees on delivery were a nice appearing lot and proved conclusively to my friend's mind that there was no fake about improved methods of propagation. He planted the trees and cared for them faithfully for a number of years till they came into bearing, and then the painful conclusion was forced upon him that he had been beaten by the nursery.

He was not much of an expert on varieties but he concluded the fruit borne by his trees could not be Ben Davis. It was not the color of Ben Davis, nor the shape of Ben Davis, and did not ripen with Ben Davis. In fact it ripened in the summer. He wrote the nursery rather forcibly about it intimating something about a law suit. The nursery replied that they were very sorry if they had made a mistake, but by way of paying him for all his trouble and loss of time they offered to top-graft his trees with one of their newest and highest priced varieties—a great acquisition. My friend swallowed the bait and told them to come on. They forthwith sent a young fellow who very quickly reduced the limbs to stumps and top-grafted them very copiously. Sometime after that while passing his place my friend asked me to stop and take a look at his orchard.

I found that the grafting had been done in a very careless way and that not one in a hundred would live. I have not seen the orchard since, but it is safe to say it will never amount to anything. The situation was splendid for an orchard, the soil was good, the cultivation and pruning had been correctly done, but the variety proved worthless for the purpose intended and the whole undertaking was a failure. In this case the man knew the variety he wanted, but through the mistake or dishonesty of the nurseryman he suffered loss. There are other cases where the man does not know what he wants, or rather does not exercise good judgment in selecting the variety.

There are hundreds of varieties catalogued, many of which are inferior or worthless for the western planter, and the man who undertakes to select from the numerous catalogue descriptions has a big job on his hands with the chances largely against him. The list is too long and might profitably be cut down one-half. In the November issue of the "Western Fruit Grower" a gentleman from Illinois who has an experimental orchard of 1,420 varieties names 71 that are inveterate blighters. I am glad to note that of eight of the leading nurseries of Missouri, Illinois, Iowa and Kansas, but 6 of these 71 varieties are listed, namely, Lowell, Bailey Sweet, Twenty Ounce, Wagoner, Fall Pippin and Sweet Bough. In my judgment no great harm would be done if each and every one of these 71 varieties were discarded. So long as we grow these blight-producing varieties we will have blight, not only will they themselves blight, but they will infect other varieties that otherwise would not blight. When a variety shows so decided a weakness as to blight badly and regularly it should be discarded, or rather, it should not be planted in the locality where it is known to blight. The Willowtwig is a first class apple in some sections, but I would not plant it on account of its susceptibility to blight together with other serious faults. For the same reason I have been compelled to grub out bearing trees of Clayton and Wagoner. There are other bad qualities that make some varieties unprofitable. Not all varieties are productive enough to be called profitable. Notable among such varieties is the Lawver; and for this and other bad failings, I think I am safe in saying it should not be planted in North Missouri. Of varieties that should be guarded against for their poor quality and general inferiority, I would mention Walbridge, Mann, Nickajack, Plumbs Cider, Eng. Golden Russett, Sweet June or Hightop Sweet, and Sops of Wine if what I am growing is the true Sops of Wine, of which I am in doubt. The only tree I have came from a nursery whose trees have borne uniformly true to name.

The fruit is very early, ripening before Early Harvest or Red June. It is nearly covered with red over yellowish ground; round in shape; medium in size; tough, dry and tasteless. And now I will mention a few varieties that are excellent in bearing and in quality, some of which are not as well known as they should be, and are not propagated by the nurseries and recommended as they deserve to be. Chenango and Autumn Strawberry are both par excellent ripening in August and September, respectively. For an early apple I do not know of anything better than a variety I am propagating under the name of Primate. I am not sure the name is correct, but the fruit answers the description given of that variety by the various cata-

logues. The tree is a slow, stocky grower. Fruit rather conical, greenish-yellow with faint blush sometimes on one side. Very tender and juicy, pleasant sub-acid. This is as early as any and continues ripening over a long period.

McIntosh Red, this is an old variety that is now catalogued but by few western nurseries. It is one of the best for the family orchard. The tree in growth, form and vigor is all that could be desired. The fruit is large dark purplish red and simply superb. Ripens in September and October. I should add that this variety is rather disposed to scab. Several years ago my father bought a number of new varieties for this section, from an Ohio nursery, among which was Whimery's Red and Bentley. They are both good keeping winter varieties. The trees have borne two crops and thus for I am highly pleased with them and believe they will be valuable acquisitions to our winter list. It was my intention to bring a sample of these varieties to the winter meeting, had I been able to attend. They are not listed by any nursery West of Ohio so far as I know.

In conclusion I would say be sure you are planting what you think you are. Dealing directly with a responsible nurseryman and then take his written guarantee as to genuineness of the variety. Any honest man will be willing to guarantee his trees true to name to the extent that he will replace free or refund money if they prove otherwise. Further than this we could not ask the nurseryman to go. Of course this does not absolutely insure the planter against loss, but it has a tendency to make the nurseryman very careful. Again, do not depend wholly on the advice of any fruit book, catalogue, or agricultural or horticultural journal in the matter of varieties, especially if you are intending to plant a commercial orchard, and above all things do not listen to the persuasive voice of the tree peddler, but take time to look through your neighbors orchards and see what is doing well and making money for them, and it matters not if they are old, well known kinds my advice is to plant them and have an abundance of fruit for your family and get rich selling "big red apples."

PROFITABLE APPLES FOR NORTH MISSOURI.

(By J. A. Durkes, Weston, Mo.)

By the term most profitable, we mean such varieties that have been for a long number of years prolific bearers of choice fruit, and can be relied on for hardiness in tree, as well as fruitfulness, over a large territory. With these standard sorts we could include others, that

at various seasons, and in favorable localities and conditions make good records. Our purpose at this time is not to go into details but briefly call attention to some of the best, and make some comments on them.

For summer the Early Harvest is well known to succeed wherever planted. The Transparent, an apple of quite recent introduction, by those who have had it in bearing a number of years, is preferred to to the former.

The Duchess has no superior—bears early and prolific, growth of tree very compact—fruit showy and a good shipper.

Maiden Blush, in some sections a shy bearer, but the beauty and excellence of the fruit commends it to our list.

For fall the Clyde Beauty is large and showy, the tree is hardy and prolific and bears at an early age. The Grimes' Golden is always sought for as one of the best, trees require some age before bearing good crops.

Jonathan has taken first rank as the best apple, the objection, too premature falling, should be secondary; when the fruit is matured it must be gathered, and by a few days the best are lost, with this and other varieties it would be well to pick the larger and best and permit the others to stay on the tree a week or more longer.

The Ben Davis is the best and earliest bearer, attractive, good keeper, a fine shipping apple, cooks well, best of all for evaporating.

The Gano will do nearly as well as the Ben Davis, the tree has been planted only ten or twelve years to any extent, so our experience as regards to it is limited, but it is gaining favor annually.

Willow Twig is a hardy long lived tree, bears well, fruit large, showy and keeps well, should be left on the tree very late before gathering. Smith's Cider in certain localities has done very well, it should be planted on dry clayey soils as the tree is subject to blight in wet places.

The Clayton is but little known possessing many good qualities. Large and very firm, making it a good shipper, keeps well, the trees have a very strong growth, bearing at an early age and extremely prolific. The Winesap is one of our best winter apples; to get choice fruit, the trees must have good attention; the knife used freely in thinning out the superfluous small branches that the Winesap is so prone to make, the fruit should be thinned also in season of very full crops.

The Small Romanite is a favorite because of its keeping qualities, and the price it brings in May and June before the early apples come to market. The tree is a good bearer and for good fruit needs extra

care and pruning. The apples should be left on the trees long as it is safe to do so. Missouri Pippin is an early and prolific bearer and is making a very good record for itself.

Many more could be named, new and old favorites, but we will leave them on the trial list. In making a choice for planting find out the kinds in your near neighborhood which have done best and that will be the surest guide for the planter to follow.

We believe every fruit grower should be an experimenter and try some kinds that are brought out every year.

VARIETIES OF APPLES THAT WILL BE PROFITABLE TO RAISE IN THE OZARK REGIONS OF SOUTH MISSOURI.

(By L. B. Woodside, Salem, Mo.)

In writing upon this question I will say that I will be forced to speak more from observation than from experience. I have one orchard of my own and another in connection with other parties, but neither of them old enough to return a profit. In the two orchards there are about fifteen thousand apple trees, of which one-third are Ben Davis, the balance Jonathan, Grimes Golden, Ingram, Rome Beauty, Huntsman, Willow Twig, Minkler, Missouri Pippin, Winesap, Gano, York Imperial, Nixonite, Mammoth Black Twig and a few trees each of a number of other varieties.

As I stated, I will have to speak much from observation, but that has been quite extensive, and has satisfied me that if I had been advised properly at the time of setting out my orchard and had followed the advice, it would have been worth much more than it is.

Up to the present time, in my opinion, there is only one variety that has proved profitable to the growers, and that is the Ben Davis. I think it hardly worth while to speak of that variety, as it is well known to every member of this Society.

We all know its good qualities and we know its defects. The Ben Davis apple, however, grown in the Ozarks, is not the same apple as the Ben Davis grown in the rich prairie lands of Illinois. We have grown Ben Davis apples this year that are almost equal in flavor to the Minkler, York Imperial or Winesap, and could they have been shipped and sold under some other name, would never be known in some markets as Ben Davis. The fact that in some sections and especially in rich soils, the Ben Davis apple is not of high color nor quality, in some markets has given it a bad name, and it sells at a discount, but, nevertheless, I would not advise any grower in the Ozarks to leave that variety

out of his orchard. One thing we might do, however, and that is, to endeavor to educate the consuming public to a knowledge of the fact that the Ben Davis apple grown in the Ozarks is superior to a Ben Davis grown in rich soils.

I do not think, however, that the apple growers of South Missouri should be satisfied with one variety, and especially when that variety is known by a name that in some markets impairs its value: and I have spent much time and some money in the endeavor to find an apple which will bear as well, look as well, ship as well and keep as well and of better flavor, and which the grower can safely put in his orchard alongside of his Ben Davis, feeling absolutely assured that it will prove profitable to him.

I cannot now speak with absolute certainty as to the results of my labors, and in dealing with the subject of profitable varieties for the Ozarks, I might as well begin with a statement as to what I am sure will not be profitable, and the reasons why.

I would not plant again in South Missouri a Huntsman, Willow Twig, Minkler, Missouri Pippin, Winesap or Jeneting tree.

The Rome Beauty is not a healthy tree: neither is it a good bearer, and it falls badly; it has, however, one redeeming quality besides its fine flavor, and that is that it seems to be immune from the Bitter Rot, and if that disease stays with us, I might reconsider the question as to that variety.

The Huntsman is not a good bearer; neither is it a healthy tree; the apple I regard as of poor flavor, and it sunburns easily and rots badly.

The Willow Twig is a fair tree, good bearer, but the worst apple to rot that we have in our orchard.

The Minkler is a good tree, bears well some years, fine flavor and good color, but much disposed to have the bitter rot.

The Missouri Pippin is a poor tree, dies early, not a good bearer, and the flavor not equal to a Ben Davis.

The Winesap is too small and scabs badly.

The Mammoth Black Twig is a good tree, a fine apple, fine flavor and keeps well, but my experience with it is that it doesn't bear sufficiently to be a profitable apple. It may, however, do better when my trees grow older, but yet I could not at the present time advise anyone to plant it.

This would leave the list from which I would select a new orchard to the following varieties, in addition to Ben Davis: Gano, York Imperial, Nixonite, Jonathan, Grimes Golden and Ingram.

The Jonathan, however, ripens when the weather is very warm,

and does not hold up well in shipping, unless in iced cars; but if you get it to market in good condition, you have an apple that will be in demand, bring the highest price and will satisfy your customer.

The Grimes Golden, however, I regard as a better apple for South Missouri than the Jonathan. It can be gathered quite as early, and it will hang a month later and bear equally as well.

We have about two hundred Grimes Golden trees, set in the year 1892, not one of which has died from any cause, and they stood the drouth of 1901 better than any apple in the orchard; not one-tenth went out as culls. The apples are clean, smooth and is the finest flavored apple that is grown. I do not believe the market will ever be overstocked with Grimes Golden apples, and it will always command the highest prices. I shipped a car load of apples in October to Minneapolis, in which were a few Grimes Golden, and was informed by agent that if they had all been Grimes Golden, they would have brought at least one dollar more per barrel.

The York Imperial seems to succeed well in South Missouri. It is of a good size, good growing tree and healthy, the apples large and of fine color and of excellent quality. We have not many York Imperial trees, and there are not very many in this county, but every grower who has them reports to me that they yield equal with Ben Davis, and I consider it a profitable variety for South Missouri.

The Gano is giving satisfaction here; the color is equal to the Jonathan, the flavor, I think, a little superior to Ben Davis, and the indications are that it will be a good bearer, but I do not believe the tree is quite as healthy as Ben Davis.

I speak of Nixonite last, as it is an apple but little known, but what few trees there are in this county have outclassed everything in the way of bearing. The tree is longlived and a strong, vigorous grower; the apple larger than any in the list above named; a bright yellow collar, and the best keeper that I know of. I have no doubt but what it is a coming apple for South Missouri. I know one tree that has yielded to its owner as much as sixty bushels in one year. It is about thirty years old, with not a dead or broken limb upon it.

I overlooked the Ingram; its only fault is its small size, and yet this year my Ingrams truned out more apples to the tree than any variety I had, and I consider it a profitable apple for South Missouri.

Discussion.

Mr. Tippin of Springfield, Mo.—I, from experience, would corroborate Judge Woodside's opinion as to the varieties, as far as I am acquainted with those that he names, and I have no reason to believe

that he is incorrect as to the Nixonite, which is an apple I am not very familiar with. Now, I hope you will understand that what I have to say with reference to varieties is based upon my knowledge derived from packing apples—not by growing them myself. Also, I hope you will please credit me with not wishing to sell any particular variety of trees when I mention the varieties that I think are best for South Missouri, for some of them we have and some of them we have not.

This season has satisfied us that the most profitable apple for South Missouri is—first, the Ben Davis; the second one, that is a new apple there, and a new apple before the public, known as Payne's Late Keeper; third, I would hardly know what to say as between the Ingram and the York Imperial. I will say Ingram and York. Next I would plant Jonathan and next Grimes Golden.

Major Holsinger.—Where would you put the Gano?

Mr. Butterfield.—In ahead of the Ben Davis.

Tippin.—I can't agree with that and I want to state my reasons why I cannot. In my opinion the reason why I would not put the Gano ahead of some of the other varieties I mentioned is because I think it is one of the most susceptible apples to the Codling Moth that we have. That is based on observation—not from any prejudice.

Secretary Goodman.—Worse than the Ben Davis?

Tippin.—I think it is. I will state that I found from observation in packing apples four years in South Missouri that the Gano is one of the most susceptible apples to the attack of the Codling Moth that we have.

Mr. Baxter of Illinois.—I will say that in Illinois we have the only orchard of Gano in Knox county; that with one row of Ben Davis and one row of Gano the Ganos were not effected with the Codling Moth as much as the Ben Davis.

Mr. Tippin.—I was speaking of South Missouri.

Mr. Butterfield.—I just went through South Missouri, but stopped in Kansas where I planted a number of Gano orchards in 1887-1888 and up to 1890, and the Gano was very much freer of the Codling Moth than the Ben Davis in the same orchard. That is my experience in my orchard in Johnson county.

Question: I would like the gentleman who had the floor first to tell the name of his second choice.

Mr. Tippin.—My second choice is Payne's Late Keeper. That is a new apple in South Missouri, named after the gentleman who originated it. You will see a plate on the table in front here. Mr. Atwood asked me to make a statement in regard to the apple. This is an apple that was introduced in 1888-9. The fact that it is an inferior growing tree

and the public had been duped so many times in new varieties, it didn't take very well and we didn't push it. Only a few orchards were planted outside of the one planted by Mr. Payne himself. He planted 240 acres. Several small orchards were planted in 1892-3, and along there and last season was the first year those young orchards bore a full crop, when it begun to attract the attention of the public.

Now, to give you an idea of how unfavorably it was received, Mr. Scholton, one of our best apple growers, planted 700 trees and he was so discouraged with the way it looked and it being a new apple, that he told me four years ago that he believed he would pull them up and I persuaded him not to. Last year they bore and when I went to get some scions to get grafts off of his trees he would not let me have one. He wanted to make every one himself and did. The 240 acres were packed last year by a Chicago dealer who bought the apples. There were four firms bid on this crop of apples and they sold under sealed bid for two dollars a barrel on the trees.

President Murray.—We want to hear from Colonel Evans.

Col. Evans.—I would give a list just as Judge Woodside has given it in that paper.

Mr. Tippin.—I might say in justice to this apple that the two years we have had the bitter rot, last year and this, that it has not been attacked with the bitter rot. Now this apple may not do any good in North Missouri. I am speaking of South Missouri, and please don't get it into your heads because it does well down there it will do well up here.

Secretary Goodman.—I agree with Judge Woodside. I put Gano ahead of Ben Davis on results of this past year. I put Ben Davis second; the next would be the York Imperial, the next Ingram, the next the Jonathan and Grimes Golden.

Mr. Nelson.—In Southwest Missouri we plant trees to make money. We are planting two Ganos to every Ben Davis, Grimes Golden and Jonathan.

The President.—We have had South Missouri. We want a list for North Missouri. Some of you growers for North Missouri please give us your list.

Mr. Gano.—My list of five varieties for North Missouri would certainly compare very favorably with Judge Woodside's. While I have given a list to the experimental station at Mountain Grove, I had a delicacy in recommending the Gano, thinking that somebody would think I had an ax to grind, and I left it out. I just said Ben Davis; but I certainly would not leave it out if I came to plant an orchard either in South or North Missouri. I should plant Ben Davis, York

Imperial, Jonathan, Grimes Golden and I certainly would plant the Ingram. While we have not had the experience in North Missouri that they have had in Central or South Missouri, it is certainly a grand apple and I should plant it.

Mr. Long.—I would like to ask Mr. Gano about the health of the Gano tree. Judge Woodside says it is not healthy. I think we ought to have something on record.

Mr. Gano.—I have not observed any difference in the character of the two trees. We scarcely can tell them apart in the nursery, and the foliage is almost identical. It is a very thick leathery leaf. The apple is very similar, scarcely any difference, only just in color, and why it should be more susceptible to Codling Moth I can't understand, for I never have observed it to be such. I get just as fine Gano as I can grow Ben Davis. While I have seen some orchards where there has been a few rows planted and neglected that have not been profitable, my theory is that nothing else would have been profitable there, and just why it should be more susceptible to the insects I cannot understand. The apples are identical almost in flavor, and in every way except color. The tree is identical and I think the Gano is just as profitable and as perfect in every similar respect as the Ben Davis.

A question: I should like to ask if the Gano will pollenate as successfully with the Ben Davis as some others. They are so similar and so much alike. Do you think they will pollenate as well as some other kind? My apples are almost all Ben Davis.

Mr. Tippin.—I wish to state with reference to what I said about the Gano that the statement was made on my observation in packing apples. Now it may have been that because most of our Gano orchards are young and there was but few apples on the trees that a larger per cent. of them were affected with the Codling Moth; I know a large per cent. of them were discarded on account of being wormy. We can only judge those things by the size of the cull pile, you know, when we pack apples. I don't wish to be unjust toward any apple or any one.

Mr. Murray, President.—I would like to hear from Mr. Flournoy concerning the pollenization, whether the Ben Davis or Gano need any pollenization, or whether they can grow in large tracts or separate from any other variety and succeed just as well. What is your experience, Mr. Flournoy?

Mr. Flournoy.—I can't tell any difference from my observations. In fact, they have too many fruits on the tree in every year I have grown except 1898, and I have seen Ben Davis and Gano on the same tree; that is, it was so pronounced by growers that were good judges.

President Murray.—Hon. Silas Wilson of Iowa will please come forward and tell us about a list of varieties for North Missouri.

Mr. Wilson.—Gentlemen of the Missouri Horticultural Society: I assure you that it affords me a very great deal of pleasure to be here and enjoy these discussions. When you had the subject of cultivation of orchards under discussion this morning, it was to me the most important that I have heard, and I will venture the assertion the most important that you will have during this session. It means more to the apple growers of this region than any other subject that you will discuss, in my judgment. It is the same old subject that we have discussed for years up further north, and as this gentleman over here said, I cannot call his name—the best thing is to apply good common sense to the conditions that prevail in that particular locality, that is the best thing I have heard said.

Now this cultivation of orchards in Iowa has been a great question with us. We have discussed it as you have here, but we have a great many careful men there who studied the conditions and have mastered the question very successfully, just as you have done here. I see no difference.

Now in regard to varieties for Western Iowa or Southwestern Iowa. I think about the same varieties that succeed in North Missouri succeed well with us. We, of course, plant the Ben Davis, though we are not in love with it very much, for home use. We don't grow apples in commercial quantities there as you do here. Then we recommend Jonathan, Grimes Golden, the Winesap: they do very well in Southwestern Iowa. A thoroughly profitable variety, the Rall's Jeanette or Jenetan would be if it was not so small. We are very hopeful that the Ingram will later on be valuable to us. I am inclined to think that it will.

A question: What do you raise for summer apples?

We grow a great abundance of summer apples. We grow Maiden Blush, Red June, Duchess and the Utters Red. Most all those apples succeed fairly well, but that is not much of a consideration with us—summer apples. They are generally so plentiful with us that there is no market.

Now the York Imperial we are testing somewhat, but we have not had experience enough to form an opinion as to its value as far north as Southwestern Iowa. It has been grown in a limited way in some of the southwestern counties in Iowa, but we don't know very much of it yet.

Now, Mr. President, I want to call your attention to the advances that we have made in Horticulture further north. Twenty-five and

thirty years ago we had men living up in Northern Iowa that we used to say to them, you will never grow any apples up there and laugh at their feeble efforts, but I want to say we can't laugh at them today. They are outranking us in Southwestern Iowa now. That man, C. G. Payne of Charles City, Iowa, has moved the apple belt three hundred miles north. He said to us thirty years ago he would do it. He has done it by a scientific crossing of hardy varieties and growing seedlings there under the conditions that prevail in Northeastern Iowa within thirty miles of the Minnesota line. He has produced a number of very valuable hardy seedling apples of high quality and good lookers, and they are growing profitable orchards to-day in Northern Iowa, and shipping car loads of apples to market, and we laughed at their efforts thirty years ago. It just shows what the gentleman remarked awhile ago—common sense applied to the conditions that prevailed in that cold, bleak, treeless country thirty years ago. And further north in Minnesota they are producing an abundance of good varieties of winter apples that are hardy in that climate. It is surprising the progress that horticulture and pomology has made in the upper Mississippi valley. We used to envy you Missouri and Kansas people with you wonderful production of apples and the way you grew them commercially, but I think by and by you will envy Northern Iowa and Minnesota. We are producing fruit up there that is astonishing, by this persistent application of common sense.

A question: What about the Wealthy apple?

The Wealthy apple is the king of all apples in that region. It is a cold storage apple. It is in my experience and observation the best cold storage apple that I have ever seen. No man that knows the Wealthy as it grows north will question the quality of it. It is very productive. It is hardy, it is desirable in every respect, only it is a fall apple, or in Minnesota it is an early winter apple, but in Iowa it can be put in cold storage very profitably. Mr. Haviland of Fort Dodge has a very large orchard, and has made as much money perhaps as any other man orcharding in Iowa, in proportion to the number of acres planted.

Major Holsinger.—Is it a fact, or not a fact, that the most of your good varieties are accidental seedlings?

No, I think not, Major. It is true to some extent, but hardly the leading varieties. I will answer you by saying, but very few of them. In fact the Wealthy is really an accidental seedling, and a number of others, the most of our productions have been brought about by scientific work in the experimental stations of Iowa; some nine or ten of them under the auspices of the State Horticultural Society, and are supported by large appropriations from our state legislature for that

purpose. There is a record kept of the parentage of those known seedlings that we may know what they are and from what sources they came, and that is being done now quite successfully, and the result of this scientific work has developed a race of new apples that has been produced in that region from seedlings. Mr. Payne has done more than any other one man in Iowa, and he is a great enthusiast along that line, and has been worth a great deal to our state, and after he is dead and forgotten we will enjoy the results of his thirty or forty years' hard labor and study along this line. It is regretted that things are that way in this world that a man may work thirty or forty years and become a benefactor, and as soon as he passes out of the world he is so soon forgotten. Such was the case with Mr. Bull, who originated the Concord grape. There is nothing to compare with the Concord grape. Now I venture the assertion that after Mr. Payne is gone, we will then begin to appreciate his work. He has certainly accomplished great things for the North.

Now you people here in Missouri and Kansas were furnished with a better climate and a milder climate. You consequently could grow fruit with much less effort than we could in Northern Iowa. I am proud of the progress of Northern Iowa in this particular line.

A question: Won't you in a very few words explain a little of the method of Mr. Payne in his cross fertilization?

It is a very interesting question. Mr. Payne is a very careful man, and he is very judicious in his selection of seedlings. When he produces a lot of apple seedlings he selects the most promising ones in growth and leaf and wood and then he top works a few of them as soon as possible on some bearing trees to produce specimens of the fruit at the earliest date possible, and he keeps this experimenting right up. He is fertilizing a large quantity of apples every year, and keeps a record of this scientific work, and then keeps a record of the seedlings, and he is fruiting them just as fast as he can. He has got a wonderful work on his ground. It would take you a whole day to see what he has got there. I don't believe you could see it all in a day. It would perhaps take longer to go into the details of his experimental station at Charles City, and he is producing a number of very valuable apples.

A question: What do you think of the Utters Red?

That is an excellent fall apple up in Iowa, or early winter apple. It is hardy, and produces fairly well fine large apples, but it is not a Wealthy.

A question: How about the Duchess?

The Dutchess is alright, but there is a question about whether it

is a Russian apple. Some of us have been led to believe it is a German apple.

A question: What about the Willow Twig?

It is a very poor apple with us. Some gentleman from South-western Missouri said that it was the worst apple to rot in the orchard, and the same applies to us, and the tree blights very badly in our prairie soils, although there are a few sections of Iowa where it does very well. But the Wealthy we call that King because it is a cold storage apple. It will keep in cold storage. I have quite a number in cold storage. Mr. Haviland of Fort Dodge has sold his Wealthy at Fort Dodge for a dollar a barrel more than he could sell the New York apples, and has for years. When he had hundreds of barrels he would take them out and get one dollar more than they got there for the New York apples. The Wealthy is a great apple.

Mr. Augustine of Illinois.—I hate to have this discussion of varieties close without having something for or against the Missouri Pippin. I am conscious of the fact that it is a poor rooted tree, but some of us who have orchards further south on the line of the Fort Scott, perhaps regard it as the quickest money maker that we have, and we are top working it to avoid the trouble of a poor root. I am surprised that we have not heard anything more in regard to it. It is a fine looker and an abundant bearer; perhaps that might be a criticism. It is a little like the Jenetan, it bears too much, but if there is anything against it I would like to know it, because I have over six thousand trees in an orchard, and I am replanting with the Missouri Pippin and the Gano entirely. I don't plant anything at all except the Missouri Pippin and the Gano in this orchard of thirty thousand trees, and I plant the Gano because, (not that it bears more and better than the Ben Davis) but the Ben Davis grown north, as it was drawn out in this discussion here this morning, as I have not heard it brought out before in any society meeting, in some localities is not a desirable apple, but when grown further south it is a desirable apple, and the consequence is that the Ben Davis is getting a little too bad a reputation in some localities as good apple.

I was up in Michigan attending the society there and I happened to say something in favor of the Ben Davis and I was afraid I would be mobbed. I was looking for a back door to escape, because they have no sympathy with it whatever. The Gano on the other hand, as I regard it, has all the good bearing qualities and its flavor is equally as good, it has a better color and it has another name. Now I am really anxious to know something about the Missouri Pippin; that is why I arose.

Mr. Jones.—I can answer Mr. Augustine from fifteen years of experience; that is not very long in an apple, but it is a little experience. I have planted down in Butler county possibly two or three hundred Missouri Pippins, and in the orchard that I now own of my own, I have possibly 700 Missouri Pippins. I have also probably 1,500 or more of Ben Davis, some six or eight hundred Wine Saps, possibly two or three hundred of the Romanite. If I was going to plant that orchard over today and for 365 days in a year, and for ten years to come I would plant it just of two varieties, I would plant Wine Sap and Romanite, and Romanite and Wine Sap. The Missouri Pippin on the old trees are just like Ben Davis frequently get in some parts of Illinois and some parts of Missouri—they will run small. Now Mr. Augustine as a nurseryman spoke of top working the trees. I would like to know how high in the top he must get. I have not yet seen a Missouri Pippin grow high enough but what the top stems were poor wood; from the ground to as high as they grow in the air they are poor wood. I can show him an orchard of six thousand trees out near Salina in Saline county, Kansas, the furthest west I have seen any large orchard in the State of Kansas, of Missouri Pippin trees that in one crop they broke off on the top limbs, and the wind came along and broke them off to the root.

President Murray.—Mr. Jones, as I understand Mr. Augustine, that is the very reason why he would recommend the top grafting of the Missouri Pippin, is to get them out of better stock.

Mr. Jones.—But the stock itself is rotten. I say that it is poor wood, and I have not seen them grafted high enough but what the wood was poor. As I said awhile ago the fruit will run small. But when you can raise an excellent Ben Davis, or an excellent Gano on your Missouri soil, what better thing do you want? Or an excellent Nixonite, an excellent Wine Sap, or an excellent Romanite, two apples that will lead in price and keeping qualities, and why do you wish to take up something that is poor, when you can get something good? I have no use for the Missouri Pippin.

President Murray.—I would like to hear from all our neighbors as to how they are getting along.

Professor Emerson of the University of Nebraska.—I haven't anything particular to say, only to say I am glad to be here, and hope to see some of you at the Nebraska meeting, which will occur about the middle of January. I was down to your meeting a few years ago, and would have been back every year, but I could not get here. I enjoy these things very much. Last night we heard from one of the mem-

bers that you had not learned everything, and that you did have a few things*to learn yet.

Now in Nebraska we have a good many things to learn yet. We come here in a very humble spirit, and can assure you that we don't know by a long ways everything there is to learn in Nebraska. We believe that conditions in Nebraska are not so very much worse than they are here, or than they are in the Eastern States. They are merely different. People who came there a good many years ago and set out orchards, that came from New York, and set out the New York varieties and then grew them by New York methods failed. Of course, they failed. A great many of those fellows will tell you you can't grow any fruit in Nebraska, but when Nebraskans come to learn that they must use methods that are adapted to their climate—they must find out what methods are adapted and must find out what varieties are adapted to the climate—then they will succeed. We have not found out all of this yet. We are hoping to learn this in time. We perhaps know more about methods now than we do about varieties, and I imagine we will never know which varieties are best adapted to a great part of our state until we have had time to produce those varieties right there. I am a very firm believer in the production and the origination of varieties in the localities where they grow. Once in awhile you will find a variety that will not do well all over the country, but most always the variety will not do well over large areas. Last year I received samples of Ben Davis apples from Rhode Island, right close to the coast where they have rain and fog three or four days in a week, and where the sun don't shine, and they were actually not as large as a Jenetan on a tree that has over-borne like everything. Some of the Eastern apples grown in the West will be about as unfavorable as the Ben Davis grown in the East.

Our conditions in Nebraska, of course, are different from those down here, perhaps, being right on the border line between the North and the South. I suppose the border line is a pretty wide thing.

We have to have varieties that are hardier, especially for the Northern part of our State; we have to have varieties that are better keepers, especially in the Southern part; such as you have to have here probably; and we have conditions varying from the East to the West of our State, and the conditions so adverse that it will be a long time before we know everything that there is to be known about methods and culture, and about varieties for our State.

REPORT OF W. T. FLOURNOY, MARIONVILLE, MO.

As the fruit industry here has only very recently assumed a degree of importance we cannot speak of changes in the methods of marketing. Further than a general desire by all interested to help along the adjustment of market conditions that seem best for the good of all concerned, there is no fixed rule as yet as a guide.

Fruit-growers' organizations are gaining in strength as a factor in teaching growers how to better handle and prepare fruits for market as well as find such markets. The canning and evaporating of fruits is rapidly assuming a degree of more importance in the handling of the surplus in localities where it may occur. Though the canneries as a rule are built in this locality more especially for canning tomatoes.

The manufacturing of preserves, jellies marmalades, etc., so far has been entirely neglected. I believe mostly for lack of time for their establishment.

The control of injurious insects and plant diseases by better cultivation and general care, including spraying, etc., has been marked by the general improvement in the quality of all fruits. To the writer it appears that the above outlined treatment by each individual has more influence in the betterment of fruit-growing conditions than legislation could have done, for this not being an arid region, diseases of all kinds are developed in the wild growths in waste places that no amount of legislation can reach successfully, while in arid regions where no water is furnished there is very little or no development of disease in waste places and localities where fruits are not raised. This locality has been apt in taking hold of the more advanced ideas in orchard management, and a desire to adopt for the immediate locality the selection of varieties most suited. The region in its early settlement was set all over with small orchards with a great variety of fruits, and together with a great many seedlings that have sprung up since. They have many and varied examples of the value of different varieties to select the very best suited varieties for commercial orchards that are being very rapidly set on land and localities, the very best suited for the growing of such fruits.

REPORT OF D. A. ROBNETT, COLUMBIA, MO.

1. There has been a great change in methods of marketing our apples in last few years. Now all our winter apples are barreled and shipped out to cold storage and returned to us in winter. Whereas they used to be stored in cellars by merchants and farmers and sold at home to consumers. The fact is our home people do not have one-fourth the fruit they should have on account of necessary high price for freight two ways, storage and two profits.

2. The fruit-growers of our section are getting much more interested in their work, and also in one another. Our old unattended County Society I am sure is going to be born again, and to live to do much good. In fact, all growers are seeking information, and to get such we must be organized.

3. We have no canneries or evaporators here. Refuse fruits are made into cider and vinegar.

4. Control of insects and disease is now receiving more attention than ever before. Our people have decided they must spray and cultivate if they would have good fruit. We have only tried by spraying, and while some can not get the results hoped for, the most persons get enough benefit to continue. Those who are the most thorough in spraying and cultivating are the most successful at selling time.

5. There has been some changes where grain crops were raised in orchard. Now they receive clean cultivation, at least until July, when cow peas or some other cover crop is sown. We also have much improved implements to cultivate our orchards with, which keeps up moisture in time of drouth.

Wednesday 2 p. m.

SUBJECT—ORCHARDS.

THE DROUTH OF '97, THE FREEZE OF FEBRUARY, '99,
AND THE DROUTH OF 1901.

(By J. C. Evans, Harlem, Mo.)

These three notable events have all been most peculiar in their effects and results on agriculture, horticulture, forests, streams, springs, etc. It is not, however, singular or peculiar that they have

all occurred at the end of the old century and the beginning of the new, for history and science tell us that every hundred years or about the end of each century most of the planets that exert an influence over our earth go off on a sky-lark, leaving the earth as it were at sea, without rudder or compass, and that these conditions always bring about extremes of weather.

It is somewhat interesting to have studied carefully the two drouths and noted results. The drouth of '97 did not begin until the first of July, after most of the crops, both agriculture and horticulture, were made, and therefore was not so seriously felt, so far as crops were concerned, especially by those interested in agricultural pursuits. It may be remembered by some of you at least, that from early spring of that year up to July 1st, barely enough rain fell to keep moisture in the surface soil sufficient to make the crop, this too, after a comparatively dry winter. All this time, during the growing season, the crops were drawing the moisture from the sub-soil, so that when the rain ceased and the drouth set in the 1st of July, the earth was dry for several feet below the surface, and in fact, drier four or five feet down than at the surface.

The results may be summed up in part as follows: The deepest rooted trees in the forest (the hickory), about the middle of August began to die, and in some sections of the country, dozens of trees could be seen at a look, that were dead or dying, and a little later, other trees began to go; and by the last of August, the orchard trees showed that they, too, were dying, so that by the time winter set in, thousands of trees in both orchard and forest, in many sections of the country, were dead or dying. Small fruits were also damaged to the extent of cutting the crop nearly one-half for the next year, besides requiring a year or two to repair the damage.

Orchards that were carrying a crop of fruit through this could not form fruit buds for the next year and, of course, did not bear a crop in '98; and this was perhaps best for the owners, as it gave the trees a chance to rest and repair the damage.

'98 was a fairly seasonable year and all crops of corn and other cereals and grasses were about up to the average, but what was the condition in the orchard and forest? As a rule, all the orchards and the forests in most sections carried an unhealthy, weak, imperfect foliage, and by mid-summer, many trees that had been weakened in vitality by the servere strain of the previous year were found dead and dying, and many more so impaired that the unprecedented freeze of February, '99, not only finished them, but damaged many others in orchard and forest and especially in the nursery to such an extent that

whole blocks of nursery stock was worthless and orchard and forest trees are still dying from the effects of that freeze, although they had all the year 1900, which was fairly⁹ seasonable to repair the damage. Peach orchards that were too old to cut back profitably were so damaged that now they are total wrecks. Those that were properly cut back are now bearing profitable crops.

The drouth of the present year, 1901, commenced earlier and continued to a later period than that of '97, and yet the permanent damage has not been as great by half, as that of '97, which commenced on a very dry earth, while that of the present year set in on a wet one, and although there has been no rain fall that reached the sub-soil since April, the trees have carried a healthy foliage and made a fairly good growth, and are in good condition to go into winter with a fairly good crop of buds for next year's fruiting, and in some sections, a full crop of fruit has been matured while the drouth of the present year seemed to have been the worst in the history of the country; and the corn, hay and potato crop have been cut to less than half, and the pastures and water supply seriously affected; yet the permanent damage has not been half what it was in '97. The damage of '97 was estimated in Missouri alone at fifty million dollars, and yet a fair average crop of all farm products and a good half crop of fruit were raised. This year a much better crop of horticultural, and only a half crop of farm products were raised. It is fortunate that these bad years have been sandwiched with better ones, for surely a famine would have resulted had they all come together; and now let us be thankful that it did not come and hope that the centennial period has passed and that we will have better seasons in the future.

While we have been suffering all these damages, we have learned some valuable lessons. We have learned that certain crops, such as sorghum, kaffir, brown dura and cow peas will grow without rain, and are good substitutes for stock feed.

We are more fully convinced of the importance of thorough cultivation, especially in dry weather. We have been forced to realize the importance of a better supply of water for our families and for our stock.

The fruit grower has learned that some varieties of fruit will stand the drouth better than others. Many other things have been learned that will be of value to us in the future. I have in mind a section of country (will call it a few countries), where not enough rain has fallen since the 17th day of April to more than lay the dust, and yet, it has produced the largest and best crop of tree fruits

for many years but in the same section the water question has been a serious one.

Many have had to haul water from three to ten miles for the last five months, and are glad to get it that way.

One village of a few hundred people get all their water for all purposes over three miles away. Neighborhoods have clubbed together and driven their live stock fifteen to twenty miles away to streams of water.

This may not seem very strange or peculiar to some; but I consider the words too mild to express the real condition.

Springs that have not failed before since the country was settled, have not afforded a drop of water for months. Wild animals and birds have had to move nearer to the borders of streams in search of water, and in some cases, families have been compelled to move to where they could get water.

FIGHTING THE DROUTH.

The drouth of 1901 will go down in history, no doubt, as the longest and most severe for many years. But with all the loss, may we not hope to have been blest in some way? First, it has brought us to realize our dependence; second, to know that if we would succeed we must fight and this is my subject.

In order to be able to successfully fight the drouth we must begin in years when we have plenty of moisture. This can be done only by proper cultivation and growing crops that will produce the greatest quantities of humus and nitrogen in our soil. How to do this will be told by giving as near as possible the cultivation of my own orchard since the drouth in 1897.

After the crop of apples was gathered and the wood ripened, I plowed the orchard, as shallow as possible, to turn under the vegetation. Spring of 1898 was very wet and cultivation was not possible nor necessary until late. In May and June we prepared land thoroughly and sowed to cow peas. The wet season having destroyed all the apple blossoms, there was no need of cultivation through July and August. During this time trees set fine lot of fruit buds.

Spring of 1899 commenced cultivation early by cutting cow peas, sown in '98, into the ground by rolling plow and cultivated until July 1st; then, again sowed to cow peas. Cow peas made a wonderful growth and big crop. The peas often climbed ten or twelve feet on limbs of trees. We also had good crop of apples this year.

Spring of 1900, the trees were laden with bloom and a large crop set. Again, I gave thorough cultivation and sowed to cow peas. Now, I am sure this was a mistake, for such a heavy crop of apples and a short drouth in August was too much for the supply of moisture, so my apples failed to be what they should have been. Had I cultivated through July and August and used the humus and nitrogen stored up two previous years, I could have gathered a large crop of fine fruit.

Now, how to fight a drouth like 1901 and how I did fight it is the question. Commenced to cultivate with rolling plows or cuttaway disc harrows, followed with drag and harrow to pulverize the clods. This was kept up until late in summer when it looked as if it were useless to continue. I felt sure, to stop would not do, so I got the heaviest roller I could find and rolled the orchard both ways. Then went over it with a fine tooth harrow and continued this cultivation until September 1st. I never had such foliage and good growth. My trees held their foliage until killed by frost. I got a crop of apples that sold for \$2.00 per barrel for No. 1 and No. 2 (that being all I asked for them) and the purchaser packed and furnished barrels.

We made some observations in July when a cloud of dust would follow the harrow and found we could remove two inches of dry dust and find moist soil beneath, while just out in the fence row where there had been no cultivation you could dig for six inches and find nothing but dry ground. Hence, we conclude that rolling and following with fine tooth harrow is the best way to hold moisture. We have learned that if we will commence early and cultivate we can carry our orchards with a full crop of fruit through a drouth that will ruin other farm crops. In fact, I would not dare write what I think can be done for an orchard, with proper cultivation when soil has plenty of humus and nitrogen stored up during good season.

President Murray.—The same subject by K. B. Wilkerson, Mexico, Mo.

Mr. Wilkerson.—I have to make the excuse of a school boy without his lesson, I guess. I am not prepared, but I will speak a few moments on the subject of fighting the drouth. The reason for not preparing a paper, and I am ashamed to say it, is that business has been so that I could not give it any time whatever, and one cause of that business being so I could not, was this drouth. That is what put me in such a shape that I had to fight for the business to keep it in the right line. Now with us at the present time, we still have the drouth and the railroads are hauling water to supply the engines that come through there, and the streams and rivers, most all of them,

excepting the main channels in Salt river, and the creeks are almost all dry, and we are in the center of about six or eight counties. I have been in other parts, but it seems to center right at that place, and if I had to say just in a few words how to fight the drouth, I should say begin cultivating early, cultivate often and all the time through the season, and if you do that, I am sure we can fight the drouth with an orchard, when the other crops would be a total failure.

Two years ago I visited an orchard, and I said to the man, if you are going to follow what you are following today, you had just as well quit the business. He was letting it grow in grass and weeds and was turning his stock in there and letting them graze in the corners, and I spoke it so plain and hit him so hard that he almost got mad, and I didn't care if he did. That is the way to get some people to do a thing. Last year he put the place in tobacco. This year he did work it, and if you would go and look at it this season you would say there was no drouth. If he had neglected it last year, and this, as he had neglected it two or three years before that, the orchard being about ten years old, I would not have given him ten cents an acre for it, for I think it would have been a total failure. As it was he had a very good crop of apples last year, and what apples he had this year were good, but with us apples were almost a total failure.

Now in our planting of apple grafts: We put out about one million plants, and out of the one million plants we have only one hundred thousand. So you will see the condition we are in there. I had four acres of blackberries. I am the fellow that told the other man what to do, but didn't do it myself. On the four acres of blackberries I didn't get a gallon. One of our neighbors, who had a patch not so large, but who worked it thoroughly got ninety dollars from his patch.

We have two orchards, one of them being on the right and the other on the left. The one on the right has been worked thoroughly; we have not an orchard, where it has been worked as thoroughly as that. There is a space that comes down between the two orchards, and the one on the left was one year the best orchard. So this year it commenced raining in the spring, and in digging trees for deliveries, it took our time and we didn't get to this orchard on the left until it got too dry, and we could not plow it. The other one we did plow. You can just reverse these orchards now. This orchard on the left was one year ahead, but it is not this year. The one on the right that was worked this year, and has been worked thoroughly every year, is a year ahead. There is two years difference right there in the orchards. I have noticed it. We have an orchard of about four hun-

dred to six hundred acres, that I have had under control, it is on prairie land, but it has been well worked and it has held up well. Of course on land where it is dry and has not been worked, many of the trees if not dead are almost dead.

What I am looking to now is the future. There are orchards, apparently in good shape, if the man don't get right down to work and give them attention another year, I think they will see the affects of it, as they saw the affects of the freeze of 1899, which we are seeing every day. There was a piece of low ground which in 1899 the freeze affected, yet we overcame it considerably, and that orchard I turned back to the man. He had quit working it and this year almost all of it died, whereas if it had been a fair season, I believe it would have been what we call a fairly good orchard, if he had not neglected it.

My idea of cultivating an orchard would be, first, plow it and plow it tolerably deep up to within three or four feet of the trees, and then go as deep as you can without breaking too many roots; that would depend, of course, on the age of the orchard and how you had worked and cultivated it before. We find that where it has been worked too deep after the roots came to the top, it has been detrimental—it checks the tree.

One of these orchards that we turned over, the man hired a man from the vicinity, who came in there and pruned a fifty-acre orchard; I believe it was in June. It cost him somewhere near one hundred dollars. Well, he says to me, what do you think of it. I says, no use to answer you what I think of it, for I never did it while I had it in my possession. So he went right on and it stunted and checked it right there.

Now when the drouth came along, if I had been going to prune, I would have pruned a little and worked more. The trouble with myself, and I expect with lots of others, I guess, is this: We undertake too much. It has been a draw back to my success. I have undertaken too much. I would rather have a fifty-acre or a hundred acres well worked, than have five hundred acres half-worked, and neglect the other; and if we will only get down to work, and work hard and give close attention to what we have, and not take too much, I believe we are sure of success.

To show you what the drouth did. There is not one in a hundred of our trees that are worth setting out. We set out an orchard of 1900 peach trees, of which 1,700 are dead. In an orchard of 1,300 apple trees there are not over fifty that lived. Another orchard of 1,500 about 1,200 died. The point is doing anything in time. Some

orchards we did in time, and we just followed from one orchard to another, and those that we began early with—we could not do it all at once—they are in very good shape, but just as we dropped down, some of them three days made a difference, and that shows you where we have too much we can't get to them all in time.

Smithville, Clay County, Mo., November 28, 1901.

Mr. L. A. Goodman, Kansas City, Mo.:

Dear Sir:—

I am in receipt of your notice of the 44th Annual Meeting of the Missouri State Horticultural Society at St. Joseph, Mo., December 3rd, 4th and 5th. I see J. C. Evans is billed to say something of the drouth of '97, freeze of '99, and drouth of '01. I have been an observer of orchards and orchard culture for a number of years, and although still not entirely sure of my general position, I have observed that it is not best to cultivate too highly. I see high cultivation held up as a panacea for drouths. Now while the present effects may be all right, I observed that those orchards that were highly cultivated were the ones that suffered the most by the cold winter in '99. The richer the land, and the more vigorous the growth of the trees, the more injury the trees sustained.

I knew some orchards planted on rich bottom land that made a very rapid growth that were entirely ruined; others where the land was not so rich, and when highly cultivated the outcome was much the same.

I have two orchards of 1,000 trees each, the same varieties in each orchard, set at the same time, on much the same kind of soil. The trees were set in the spring of 1888. In the spring of 1893 I undertook to seed to clover, one was seeded in rye in fall of '92 and the clover seed sown in spring 1893, and I got a good stand and the land has not been plowed since. These stood the freeze of '99 with very little damage. The other orchard did not take well and was broken up and seeded three times before getting a stand of clover. This three years cultivation caused the trees to outgrow the trees in the other orchard. And also to be much more injured by the freeze of '99. I observed the same effects in other orchards. I have also another orchard set in 1891, part of the land is worn from cultivation, other parts was fresh land. The trees on the richest land, where there was the most rapid growth, showed decidedly the most injury from drouth of '97, also from the freeze of '99.

From these observation I conclude that high cultivation is not without its drawbacks. I feel sure that highly cultivated land will take the trees—especially if young—through in better condition than where not cultivated, through a drouth like the one of 1901. But a yearly repetition will surely cause the trees to be much easier hurt by cold weather and will also cause them to blight, where slower grown trees will be all right.

Respectfully,

C. AUL.

EXTRACT OF LETTER FROM CLAY COUNTY, MISSOURI.

We had but few apples here and it was very good for the trees. My trees have nearly recovered from the freeze of '97 and '98.

I visited some of my neighbors' orchards that were excessively summer pruned two years ago that were very full of apples, and they did not believe in thinning and the result is nearly whole rows of trees are dead. When I see their trees I am almost glad that I had but few apples. Our strawberries looks very well to have grown with so little water. It is drier here than it has been since last spring. There isn't a pond or stream but what is practically dry. I would like to ask the question, will it do any harm to plow the orchard in November. I will express box of apples containing ten varieties and if there is an apple display you can put them on exhibition, if you think them worthy. Those Ganos were grown on trees, top grafted on a crab, and the body isn't more than half as big as the Gano part. The trees were full and all of the apples large. I had intended to write about the doings of my berries, but the hail storm got them and so there was nothing to write except Haverland and Bubach are a way a head, and I think Ridgway is the best to plant with Bubach, and Clyde with Haverland.

Yours truly,

G. T. ODOR.

Cowgill, Mo., December 2, 1901.

Mr. L. A. Goodman, Secretary of the Missouri State Horticultural Society, Kansas City, Mo.:

Dear Sir:—

Your favor of a late date is received for which you will please accept my thanks, as I am now past 82 years of age. As I am feeble I will not be able to come, but I am sure your meeting will have a

large attendance and will do much good for the cause of horticulture, as such meetings have done in the past. Many of our orchards are now beginning to fail and we will be compelled to plant new orchards from this time forward or do without fruit. These new orchards must have careful people to plant and cultivate with much toil and care. Many of our orchards are now failing and it will be sometime before we can depend on the new orchards for our apples; so we can see the work before us. The rising generation will want apples, and other kinds of fruits. Many people neglect their orchards. This is not business, it is money thrown away. I planted my first orchard in the spring of 1854. That year was a very dry year, but I saved my orchard by irrigation. Be sure to take good care of your orchards if a few other things are neglected. I know your meeting will be a success as formerly.

Yours truly,

WILLIAM McCRAY.

DISCUSSION ON FIGHTING THE DROUTH.

Secretary Goodman.—I agree with what has been said on thorough cultivation, and yet I know that there are places where that continual cultivation, that intense cultivation will simply burn out all the substance there is in the soil, and after a few years of that kind of work I am satisfied that it does as much injury to the soil itself as anything else we could do. I don't know that that is true in all cases, but I do know certain localities where that thorough cultivation in the hot sun during the whole of the summer burns out almost every bit of humus there is in the soil. In Southern Missouri there are many localities of that kind, and hence we have to be more careful in our cultivation. In Southern Missouri there are many localities which are rather steep, and hence we have to be careful in cultivating those. So we have three or four ways, or different plans of cultivating. One plan is, from the first of November on to spring we run the plows through the whole of the winter; plow up the whole ground, whether planting it in corn or anything else. We plow that ground and leave it rather rough and turn under all the weeds and trash there is; it helps keep the soil from washing too badly in the winter time. But the tree rows themselves we cultivate. Another step we take is where we seed a lot of our orchards down in clover, but at the same time we cultivate a space ten feet wide, five feet to each side of the tree, and that we cultivate only six or seven times during the summer. Another plan is: The same ground we turn over during the winter time we plant

in corn and then cultivate the rows the same as the corn. Another plan we follow is to replot all ground in June and sow it to cow peas, and then cultivate the tree rows. This tends to give a covering over the top of the ground and rather protects the ground. I am thoroughly satisfied that in many cases it is worth more than this continual cultivation, although I am almost afraid to say that before horticulturists. Nine out of ten of us do not give enough cultivation, and the only way to carry the trees through in good condition this last season, was by thorough cultivation, and we accomplished this by giving that thorough cultivation to a space five feet wide on each side of the trees, and giving the center either one of the three plans, which I have given you. In all our work we try to cover just as much ground as possible. We aim to do the work so as to keep all the teams busy the whole season through, and that is a great question for me to settle, to see how much work I can get for those teams, so we cannot lose a moment's time during the whole season.

The fourth plan is, in the fall of the year we sow to rye, and this same ground that we broke up this year for instance, we let that go until fall, cultivating the tree rows, and then next fall plow it up and sow it to rye, at the same time leaving this strip ten feet wide. Now next spring we plow under the rye, and along in June when the rye is just about ripened plow it under and sow it to cow peas, or sometimes plow it again and plant it in corn, so that it gives us almost you see the whole twelve months in which we can plow and take care of our orchards; so that with the teams that we have at work on the orchard we can get over two or three times as much ground as you can by following any other specified plan.

I believe in thorough cultivation for this season. I know that during that severe drouth, when we had trees loaded with apples—in order to help them and save them, we went through first and thinned them about one-half, and then this row that we had been cultivating pretty thoroughly we went through and harrowed, as friend Robnett has told you of harrowing the whole of his orchard. Now he could do that through the whole of his orchard, but I could not do it to mine, but we did this strip of ten feet wide, and I am sure that helped the trees and they ripened the fruits. So, we want to study the location, and we want to keep informed. This cultivation is a preventive of the drouth, and we can fight the drouth during the dry season and keep the trees healthy at the same time by so doing, but at the same time I want to throw out the caution here, that clean cultivation, thorough cultivation year following year, in that Ozark orchard land will simply burn it out so there is no humus left in the soil at all.

A question: What would be the objection to alfalfa being sowed in between the rows instead of clover and cow peas?

Secretary Goodman.—I prefer clover to the alfalfa.

A question: Why?

Secretary Goodman.—Because in two years time you have got enough seed on the ground to reseed it, and if necessary you can plow it up and sow it to rye, and next spring you will have enough red clover come up to make a pretty good stand. If you choose to put it in corn you can do so. That alfalfa down with us is very much harder to get to stand. I have tried it for four years and only got one stand out of four years, and it cost us a great deal to do it. Of the red clover we can get a stand.

President Murray.—I would like to ask Mr. Goodman how many trees he is cultivating?

Secretary Goodman.—I am cultivating 2,100 acres. I have 167,000 trees and it takes lots of time to do it, and we study every way possible to get all the work we can, and every team and every man is at work every day; and some of it we didn't plow last summer except the tree rows and there turned the weeds under, kept the tree rows clean, and that ground we are plowing and will continue plowing every day all winter long.

J. J. Kiser, Stanberry, Mo.—There has been so much said and printed lately about thorough tillage in orchards that I feel compelled to enter a protest. It may be all right in localities where there is not danger of soil abrasion or wash, but with our sandy loam on hillside, if the whole surface was cultivated or worked into garden bed condition a hard rain would wash the soil off and leave roots exposed. I have seen soil washed off as deep and in places deeper than it had been stirred an irreparable as well as an unnecessary loss.

I would suggest two methods suitable for our soil: First, planting the orchard in rows as nearly as possible horizontally along hillsides, paying no attention to the points of the compass or straight rows, cultivating the tree rows for a term of years and leaving the middle of the spaces to clover, then putting the tree rows to clover and cultivating the space between; or second, to sow the whole surface to clover and cultivating with a Morgan spading harrow that will loosen the soil but not tear up the clover plant.

Mr. Baxter of Illinois.—We, up in Illinois, begin to fight the drouth by the same means that we fight too much moisture. We are tiling. I have a vineyard that has been tiled for several years, and I have the finest vineyard in my county. I raised a fine crop this year and I got \$500 off of my vineyard. Now this vineyard was thoroughly

tiled and thoroughly cultivated. I also had a piece of strawberries on the same kind of ground that brought me a magnificent crop this year, and I have a fine stand for next year, while most of the patches up there are in very poor condition for next season. I am satisfied that with most of our soils if you cultivate thoroughly and keep a good mulch you wont need to fear the drouth. The same way with our corn fields the ground is tiled, and we had a good crop of corn. I know of corn that yielded as high as fifty bushels to the acre, and as dry as it is this fall there are a great many farmers that are going into tiling.

Mr. Murtfeldt.—I want to know whether there is any truth in the assertion that if you cultivate a bearing orchard while the trees are in fruit, the apples will drop?

Secretary Goodman.—It is not true at all.

SPRAYING.

(By W. D. Maxwell, St. Joseph.)

Mr. President and Members of the Horticultural Society:

Your Committee on Program could not have given me a subject upon which to prepare a paper of greater importance to horticulturists than that of spraying. Orchardists have learned by observation and practical experience what to plant, how to plant and the best methods of cultivation. There are but few well kept orchards. We had better never plant out an orchard if we don't intend to give it our close attention. A wise man will always avail himself of the best information possible in order that he may be successful in his business. In an experience of 35 years in fruit growing, I have learned some valuable lessons. Some by practical experience, but many by observation. When I commenced planting I had the advantage of one of the most practical and successful fruit growers of that day. I refer to Zephth Todd, one of the first settlers of Andrew county. At that time we had perfect fruit. We did not have multitudes of various insects to prey upon our fruit. Today we are face to face with a most difficult question and that is how to destroy the enemies of our fruit? Some are sorry that they ever planted an orchard, others are inquiring what to do. It is the honest inquirer that we hope to benefit. Our worthy President says "cultivate thoroughly," another says "burn up all of your cuttings" and some one says give them "a drastic dose of arsenic

poison." I believe that all of these are good remedies, especially the last mentioned. The question arises, how are we going to do it? I answer by spraying, I have been spraying for six years. I have read everything I could find upon that subject. While the results have not been just what I desired, yet, I have succeeded far better than by neighbors. They attribute my success to location and good luck. But I am convinced beyond a doubt that is the spraying of my fruit.

And the only reason that I have not had better results is that I was not as thorough in spraying as I should have been. I think that is the experience of every one that believes in spraying. All will admit that it will require heroic measures to succeed. My advice would be "if you don't intend to apply the remedy you had better quit planting, and stop furnishing a nest bed to breed insects to prey upon your neighbors orchard." I sprayed the first four years, three times a year, using the liquid formula. Last year I sprayed four times, applying the Hillis dust compound to a part of my orchard and the liquid to the balance. I sprayed the different lots the same day. At gathering time I picked about all my fruit where I had used the dust. Not only did I get my fruit where I sprayed with the dust but, the foliage was more perfect.

I had more fruit than all of my neighbors put together. The editor of the Fruit Grower will bear testimony to the statement as he was in my orchard, and was in my neighbors also. He was in my orchard this year at gathering time. So I will let him speak as to the condition of the trees and fruit. I was pretty well satisfied last year that the dust compound was the thing. But now I am convinced that it is far better than the liquid. This year I sprayed six times with dust, once before the bloom opened, then just as it dropped, the next week twice, then once a week until I had sprayed the orchard six times. I intended to commence again in July and spray up to the middle of August, but did not and there is where I fell down. The drouth was so severe I was afraid I would kill my trees. I have never had a smaller per cent. of culls than this year. I gathered as fine a lot of apples this year as I ever raised. I had only about 12 acres with a full setting of fruit, with scattering fruit on the balance of the 30 acres. I sold my fruit for \$2,200 on the trees and reserved 30 barrels of my choicest fruit. So you see I believe in spraying. Now, I will give you some reasons why the dust spray is far better than the liquid. In the first place there is much saving of labor. You do away with the hauling of water. One man can spray as much in one day as three with the liquid. Again, water is only used in your liquid to convey your arsenite poisons, while fresh slacked lime is a fine

insecticide of itself and a much better conveyer than water. In the liquid formula it is very difficult to get a proper mixing of the ingredients, so the distribution will be equal at all times. With the dust compound, lime being the principal part, we can very greatly increase the amount of sulphate of copper, arsenic poison, concentrated lye and sulphur. All of them being components of your compound. If you are careful in the preparation, seeing that the different parts are thoroughly mixed together there will be no danger of injury to the trees. In order to reap the best results you must be careful in preparing the compound. In spraying with the liquid it falls only on the upper side of the leaves, while the dust envelops the entire tree and covers the vegetation all around, but these are not the best reasons I have. We know that the Bordeaux mixture is recommended as the only remedy that will prevent the fungus growth on the apple. We can only use about four pounds of lime to 50 gallons of water. So the amount of blue stone must be limited, also, the arsenic poison or it will burn the foliage of the trees, and that means the death of the tree. But with the dust compound you need have no fear of injury to your trees. Scientists say that scab on the apple is produced by a spore that floats around in the air, If that be true you can plainly see that the dust process is far better than the liquid. I made the compound much stronger than recommended by Mr. Hillis. What I want is a machine with power sufficient, not only to cover the tree with dust, but one that will fill the atmosphere full of it. That, I believe, I have found in the Johnson Cyclone sprayer. I have seen his small machine operated. It is by far the best machine I ever have seen. He has my order for his cyclone sprayer. The best horticulturists tell us to spray. Buyers are hunting orchards that have been sprayed. Commission men want fruit that has been sprayed. W. D. Graham, to whom I sold my fruit, said wherever he found a good orchard of fruit, it was one that had been sprayed. Fowler Bros. of Iowa told me the same thing. You will find this to be the experience of all good buyers. But there are many horticulturist that don't believe in it. Those among them who have sprayed, had but little faith when they commenced, and quit off the same way. They remind me of some farmers I have seen raising corn. They plant and fail to apply the means necessary to a good crop, and are disappointed at harvest time, while their neighbor is not only careful in planting but he employs his brain and physical energy, with all of the improved methods of farming and he succeeds. So it is with the wide awake horticulturist. Hoping that I have dropped you some thought that may be helpful to the inquiring one, I will close by propounding the question "does it pay to spray."

Mr. F. H. Speakman of Neosho, Mo., spoke on the same subject as follows:

I would say that for the most part in our spraying operations we have used the liquid form, and I am convinced of the good results of that. What the other will do, I am not so well prepared to say, although we have experimented in a small way with that, with the dust spray, but I am greatly in hopes that much good will come from its use. It is much more easily applied, and if it will do the work as well will be a saving of labor and a great deal of expense, which comes at the time that one can hardly give it; that is, the labor is all needed elsewhere. There is everything to be done at that season of the year, or nearly so it seems, and while I hope for more from the dust spray, I am not in a position to say that we have obtained good results from it.

The first spraying that we do and have done each season is the blue stone solution, which is applied before the bud swells, about the middle of March, and that I think is one of the most important applications made during the spraying season, inasmuch as that is the time to rid your orchard of fungus diseases, the apple scab fungus and probably several others, and by the application then you can do much more thorough work than later for that particular object. Then when the leaves come out, and after the blooms have dropped, we have sprayed the past season more thoroughly than others with a strong solution of Bordeaux mixture, and also used Paris Green for an insecticide, and then after that we have given about two applications of the same formula, and later have applied the dust to some extent, but I am convinced of the value of spraying with liquids. The liquid alone is a solution of the problem of preventing fungus diseases and insect enemies from ruining our future crops. I have had a good opportunity of testing that the past season inasmuch as our orchards have been over run during their early years of bearing, or attempts to bear, by these enemies, and the past season our crop was a very satisfactory one, while other orchards around there were almost ruined by the different diseases and enemies.

I will relate a little experience with one small orchard that I had. The orchard yielded 138 bushels of number one and two apples, and in looking at these apples at a little distance you would think they were all perfect. They were large, highly colored, very fine in appearance at a little distance away, but upon picking and packing those for market there were nine bushels of perfect fruit and 129 bushels of number twos, strictly number two. There were no number ones amongst them at all, while in our own orchard that had received

thorough work in spraying, although I don't think it was as thorough as it should have been, we had fine apples. I believe in the application of the spray in some form, after you find it necessary to apply even four applications. It was very dry and everything seemed to be going wrong and the fruit was at a stand still, no indications of anything better; the water was hard to get and we didn't do any more spraying with the liquid formula, and very little of the dust. I think to have overcome the last crop of Codling Moth, our results would have been much more satisfactory had we applied the spray once or twice more. As it was the results were very marked, as the orchards yielded probably three-fourths of fruit, free from the Codling Moth. There was no scab whatever, and other insects besides the Codling Moth were not present to any degree.

President Murray.—Will you give your formulas of what you sprayed with?

Mr. Speakman.—Our first application was blue stone solution. three pounds of blue stone to fifty gallons of water, applied on the trees before the leaves appeared and before the bud swells, thoroughly, and the other applications were about four pounds each of lime and blue stone and a third of a pound of Paris Green and fifty gallons of water. I have found no injury as the result of the application of Paris Green, applied and used at that strength, or that amount. I think that one of the most important things for us fruit growers to do is to secure a guarantee of the strength of the poisons that we see fit to use. I think blue stone is probably about the same wherever we find it, but all poisons, the arsenics, Paris Green or white arsenic or whatever we may use are not of a guaranteed strength. We need a brand that can be depended upon to do certain things. If it is weak let us know it, and if it is strong let us know that.

Mr. Smith.—I would like to ask a question of the gentleman, or any one may answer it. Up in our part of the country a part of my orchard I sprayed once, a part of it I didn't spray at all, and I didn't see two square inches of scab in about four hundred barrels. Now I am wondering whether we are not arriving at some conclusions without sufficient evidence. Again, in the same orchard I didn't find on an average of one Codling Moth in a barrel of apples without any spraying at all in one orchard and with one spraying for Canker Worm in the other. Now is it not a fact that in these years we are pretty clear of scab and Codling Moth, spray or no spray? I believe in spraying, but I want to know just exactly what we are doing.

Mr. Speakman.—Well, concerning your scab, I would say there was very little of that with us, in either sprayed or unsprayed orchards

in Southwest Missouri. I do not consider the spraying this season in Southwest Missouri a test on the scab with us.

Mr. Smith.—Now how about the Codling Moth?

Mr. Speakman.—Well, this little orchard that I mentioned was a half grown one. There were some orchards that were not cultivated, that were not sprayed, that had good fruit, but I think not the proportion of perfect fruit that the sprayed ones had. It depends altogether on cultivation and treatment. I think the harboring of the insects has a great deal to do with it, and it is necessary to remove them. In connection with this spraying thorough cultivation is employed, and all the grass and weeds of different kinds, everything that appears under the trees is all kept out; that no doubt had its bearing.

Mr. Baxter of Illinois.—I will say for Mr. Smith's benefit, what is true of one is true of the other. Fungus diseases are similar; and we have been spraying for 12 years. There are a great many grape growers in Illinois, and a great many of them were against spraying and we made repeated efforts to show them that it was a success and that it was the only means of preventing the rot, and you can't find a man that don't think it is a good thing today. We tested it by spraying one row and not spraying the other row, and we had a good crop on the row we sprayed while not on the other. We sprayed the outside row so as not to spray the other row, and when we came to picking time in the fall that one row didn't have anything left on it. Now you could not tell people there spraying was no good.

J. J. Kiser, Stanberry.—I felt that the words used in this discussion ought to be carefully weighed and sincerely spoken. The process of dusting instead of spraying is of almost infinite importance. To save the handling of the immense quantities of water as well as the time used and results obtained is certainly of great importance. No one can claim any benefit for the water applied, and if the insecticides or fungicides can be as well or better applied without it, why use it?

Evidence is accumulating to prove that the dust when properly applied is effective and the ease and rapidity of its application is beyond question. Two hands and a team dust from 1,200 to 1,500 nine-year set trees from daylight until dew is off.

To be honest with ourselves and to ourselves, we should point out mistakes as well as successes. I dusted a part of my orchard with a dust that I guessed contained arsenate of lime. I had incorporated white arsenic with water and lime and used this in the proportion of four ounces white arsenic to two quarts water to 10 pounds rock lime. It made a very fine dust, easily applied. At our last meeting at New

I have a fruit grower told me that he was afraid that this process would burn up the arsenic or the sulphate of copper, as well as the lime itself. I used it, sulphate of copper, the same way in solution in the ratio of 8 ounces sulphate of copper dissolved in four quarts of water on 10 pounds rock lime. I believe now that he was right; where I dusted with this a large proportion of apples were wormy, but where I dusted last year (once) and three times this summer with one pound Paris Green or London Purple to 20 pounds of the copper and lime preparation above described not five per cent. were wormy and not five per cent. fell off. I look for yet better results next year.

In a bulletin of the Department of Agriculture (*Farmers' Bulletin* No. 127) I see that arsenate of lead can be bought at 10 cents per pound in dust form to be mixed with lime dust. This may be just what we need. Let us try all things and hold fast to that which is good. It has been demonstrated that Paris Green or London Purple mixed with lime dust has been effective as an insecticide; that powdered sulphate of copper and lime dust has been effective as a fungicide and that these two mixed form an effective means to head off our insect and fungoid enemies. Add to this ashes, sulphur, tobacco dust, potash, arsenate of lead as above mentioned and a number of dust forms that have barely been tried and we can muster an effective force that will be irresistible. I have for two years and will again appeal to our professors of chemistry to make an earnest effort to perfect the different dust formulas as they have made effort to perfect the liquid formulas.

Mr. Butler.—I want to say that I have had a little experience with the dust spray this season and I am not satisfied with the results. I find that the time when the dew is on the leaves is the best time to use the dust spray, for I don't believe a dust spray amounts to anything unless there is some moisture to catch the dust. That has been my experience. I have heard it advocated that it makes no difference, but I want to say that I think it does. I want to say that I am not satisfied with the results, and I believe in spraying and in thorough spraying. I don't believe in spraying once, but I believe in spraying as many as six or seven different times, and I believe in my experience that the liquid spray will give the best success and the best results.

Secretary Goodman.—I want to give a little experience with the dust spray. I want to say before I begin that I don't think that the dust spray is equal to the liquid spray. I must say that in the beginning because I have not tested it long enough to say that it is as good or as some have said here that it was better. I have asked men that have had a good deal of experience with it, Professor Stinson and

Professor von Schrenk, and a number of others and they give it as their opinion, (which coincides with what my experience has proven so far) that the dust spray is not equal to the liquid spray, but in my case, it is a question of whether I would spray at all or not. It is simply an impossibility for me to ever spray my orchard with the liquid spray, and so I began to study to see if I could not find some way to get on this dust spray. As a result I have had seven dusters at work, two of them large machines that go in a wagon, five of them small machines that hang on your shoulder, the same as the Calhoun Seeder does, and run just as easily, and with those machines I have sprayed during the past summer 240 acres, three times. The first dusting was just after the blossoms dropped, and the next dusting was about ten days later. It then began to get dry, and I had to get a time in which we could dust so that the dust would stay upon the leaves or the young apples, and so I kept putting it off thinking possibly to get a favorable time, but I did not, and the last dusting or spraying was done in the middle of August. I feared then that perhaps we might have the bitter rot, and so I thought I would use it as a preventive. I am here to say that I am satisfied with the use of the dust spray. I don't know that it is as perfect as the other; I don't believe it is, but I can put it on three times while you put the liquid spray on once. This last summer was not a fair test because through the whole summer you could get out in the orchard almost any time with a wagon load of water, but some years it is almost impossible to draw five barrels of water through the orchard and spray the trees. With these little hand spraying machines the men go out at four o'clock and dust from that time until eight o'clock in the morning, and that is a half days work, and I pay them for it. If they want to work the rest of the day we would pay them for that. We go over the ground quite rapidly. I used ten pounds of lime, one pound of Paris Green and one pound of dry Bordeaux mixture, and that is the mixture that I made. This dry Bordeaux I bought from Liggett Brothers, New York, large wholesale druggists, who make a dry Bordeaux of their own and sell it. They manufacture also a mixture of Bordeaux and Paris Green. I sent for a lot of that. It is mixed there and is shipped in barrels. The mixture cost me nine cents a pound, the dry Paris Green fourteen cents a pound, and the Bordeaux mixture cost me twenty cents a pound. They mixed a good deal of lime with it, in order to sell it for that price.

Now I tried another experiment on 40 acres. I took Hammonds slug shot as the poisonous matter; I took Hammond's grape dust as the fungicide. I wrote to him and he said he didn't know that it

would do much good for the bitter rot, but he used it there on the grape. So I bought four hundred pounds of each of those, and I put two pounds of each of those (The Hammond's slug shot and two pounds of his grape dust) with ten pounds of lime, but as to the result I cannot say, because some other orchards close by have had pretty fine crops, but I do say that the orchards we have dusted have given better results and more perfect fruit than the part of the orchard that I did not spray. I fell it is a step in the right direction. Just how much it is worth and just how much it will be worth yet, we don't know; we don't know all about spraying anyway and I am sure that spraying has come to stay, and the only thing is to know when to do it and how to do it and what kind of mixture to use and just when to put it on. The experiments, that I am carrying on in our orchard, are in a large way and I feel satisfied to continue them for years to come. If I can keep these insects and these fungus diseases out of the orchard, I am going to keep dusting continually every year.

George Murray.—I want to make one suggestion. I would suggest if you contemplate trying Mr. Kiser's formula that the first thing to do would be to take out a good heavy life insurance policy, because that formula, if it is of good pure chemicals, and if you get enough of it into the air to kill the insects, you will kill yourself. At least if it don't kill you, you are liable to be laid up for a long time. This may sound like a joke but it is a fact. I have heard of parties inhaling enough of this dust poison to make them sick. I have not had any such experience. I have had more experience with the liquid spray, but I want to say that in my opinion it is only experimental work, and both Mr. Goodman and Mr. Speakman have admitted as much. Now I want to make this suggestion. I know that we hear a great deal on this subject, but we hear only from one side. I believe in spraying. I don't want to be understood as condemning spraying, but I do want to hear both sides. * * * * I know it is a little embarrassing for any man who has failed, to get up in a meeting like this of progressive fruit growers and make that admission, and that is one reason that we hear so little. Another reason I believe is that some parties who are interested in the cause of spraying from a pecuniary standpoint keep this subject before us. They push it and keep it right to the front and we hear only one side.

Now in regard to the dust spray, I know nothing about it. It may be alright, but 20 years ago we thought the liquid spray was alright. We thought that was just the thing, and today many of us are considerably skeptical whether after all it is doing us very much good.

We think it is. However, we don't know, but all Missourians have to be shown. * * * * I would like to hear from the other side. The testimony is not altogether with the successful side, although they claim it is successful.

Mr. Robnett.—I bought one of those dust sprayers and thought I would kill the insects around my home, and filled my lungs with Paris Green, and if any one wants that Liggett sprayer he can have it at a very small price. I would go around the yard with it and it looked to me when got on the other side of the tree, the wind got there too.

Mr. Baxter.—I don't want the impression to go out that the spraying for grape rot is an experiment, and I believe what is true of grape rot is true of other things. We have been spraying in Illinois for 12 years, ever since 1890, and we have demonstrated for a positive fact that it is a success, and I will pay the expenses of any man who will come up there and investigate the matter thoroughly if he don't come back and say that the evidence is overwhelmingly in favor of spraying as a thorough preventive, and I have no sprayers to sell.

Mr. Jones.—I have not any sprayers to sell, nor am I interested in any sprayers and speak only in regard to my own orchard, but I do know this: I bought some trees from Missouri and they were infested with Canker Worms, and those Canker Worms increased for two years before we thought there were any Canker Worms to amount to anything there. We then woke up to the fact that we must do something, and we began to do it at a lively rate with the water spray and we cleaned those Canker Worms out. We could put the water right on there with the poison in it, and we could count the worms by the hundreds as they were dead, and we drove those canker worms out of that orchard, off of about 200 acres of ground, and this year I never saw a finer foliage on trees, and it staid on the trees until caught by the frost just a few days ago. I know of orchards in Illinois which this man from Quincy, Mr. Stahl, got for five dollars an acre; he was to have all the fruit for \$5 an acre, and he went in there this spring and has annihilated the canker worm, that was the pest of that whole country. And the orchards that he has treated—you can count the square where an orchard was that he sprayed. You can see it for several miles in comparison with one that he has not sprayed. I know it is good for Canker Worm, I know it is good for Codling Moth, and a great many other things.

A question: What did he spray with?

He sprays with Paris Green chiefly in the liquid form.

Mr. Howard.—I want to enter a plea against the dust spray being

condemned on this evidence alone. At the experiment station at Columbia we tried to make an impartial test between the two, the dust and the liquid, but at the end of the season there was not a particle of difference between the two. That is, there was no rot on any of them; none whatever.

Mr. George Murray.—The Canker Worm must have changed when they got over in Illinois. I have never seen a liquid spray that would kill the Canker Worm.

LEAF ROLLER.

(By Prof. J. M. Stedman.)

I simply wish to supplement my remarks last spring in regard to the Leaf Roller, and I will say that since then I have worked out the complete life history of the insect, and find that there is only one brood a year; that they hatch out in the early summer and deposit their eggs, and then those eggs stay on your trees during the remainder of the year, and hatch out next spring at about the time, or just a little before, the blossoms open. I have some of the eggs here on a piece of bark. It is not necessary to pass it around. If any of you wish to see them after the meeting, you can come up and examine. You will find that so far as the eggs are concerned it is almost impossible to gather them during the winter, because these eggs are very difficult to find indeed.

THE "STING" IN THE APPLE.

In regard to the so called stinging insect (I use that term because of the fact that it is used in advertising the Moth Catcher so largely that everybody knows what I refer to. It is called there a stinging insect), referring to the ichneumen, which I have always said never did the stinging, I know absolutely it does not, because I now know the insect that does do the stinging, although I did not at that time. All of you know that two years ago, and more or less last year, the apples were stung by some kind of an insect that converted what would otherwise have been a first class apple into a second grade. That is where the damage comes. Now that was one of the worst insects, one of the hardest insects to breed that I have ever worked upon, and after having worked out its life history, I was perfectly surprised to find that it was nothing more or less than the well known little rascal, the plum curculio. That plum curculio when it comes to attack the apple work so entirely different from what it does in the plum and cherry that nobody recognized the chap from its work. Instead of making a little hole in the apple and laying

an egg in there and then cutting a crescent shaped slit, as it does in the plum, (and we all recognize the work there) it simply makes a little hole through the skin with its beak, deposits the egg beneath the peel and cuts that crescent shaped flap through it. That is what threw entomologists off, and that is the reason we did not know what insect did it. Hence the fact the insect was so hard to brand in the apples. Not more than twenty-five per cent. of the eggs deposited in these apples ever hatch at all, and not more than fifteen per cent. of those that do hatch ever reach maturity. Now that reduces the injury they can do to the apple to an enormous extent, and it is fortunate for us that it does so. The insect hibernates during the winter; it hibernates under all kinds of rubbish. Using that term I include the mulch of all kinds, stones and rubbish of all kinds near the orchard. The next spring they come out and deposit their eggs in the apple when the apple is about the size of a walnut, as a rule. The insects take about six weeks to deposit their eggs, keeping it up right along during that time; that has thrown entomologists, and especially fruit growers off their guard, thinking there was two broods a year, the last brood doing the damage. As a matter of fact there is only one brood, and it is the first brood that keeps up the depositing of the eggs and causes the trouble in the fore part of August, and in some cases up to the 15th of August. Soon after those insects have laid the eggs, the larvae hatch. If it does not, that cut will heal up and leave a scar, but no permanent rupture of the skin. It will heal up and leave a space there that will remind you of an apple scab that has refused to go any further. But the later punctures do not heal up. The result is at picking time those punctures are through the skin, and then the bitter rot starts to grow, and hence the rotting of the apples, and putting the apples from the first down to the second grade.

Suppose the egg hatches, which I say it rarely does, the insect then works helter skelter through the pulp of the apple and presently comes outside and drops to the ground, while the apple is still on the tree. If the apple drops then it comes out of the apple any way. In either case the creature enters the ground, sometimes six inches, makes a pupa, remains in the pupa stage about three weeks, when the adult beetle appears, and soon becomes hard and seeks a place to hibernate. Some of the hardier ones stay in the ground over winter.

Now as regards remedies. Bear in mind we know absolutely what insect makes a sting. We know that it is not that so called stinging insect. What are we going to do now for this creature? The moth catcher has been advertised very largely for that stinging insect problem, and I have always been saying that the insect advertised as the

stinging insect was not the chap. I have been frank and admitted that we did not know the insect that was doing that work. Now I have made my tests, and we know what insect it is, and I want to say that you cannot catch the insect in that trap—I don't care how many affidavits come in from gentlemen who know nothing about insects. I know the gentleman who manufactures those traps has recommendations from men, and affidavits to the effect that plum curculios are caught in those traps. You cannot catch them, except now and then by accident, and there is no earthly use of your using those traps in your orchard for that insect. We cannot spray for that insect. It will not do any good to spray for that insect. No spray, so far as I know at all, will effect it. The best thing I know of is clean cultivation, cultivate thoroughly if you can; keep all trash, rubbish of all kinds, stone piles even, weeds and mulches, and so on, away from your orchard, and turn just as many poultry in there as you possibly can, from the fore part of July just as long in the season as you can. The poultry I find is the very best thing in the world for this insect. When the apples drop, or when the insects come out, provided the apple stays on the trees, the poultry will catch them in many instances before they get in the ground. Furthermore, when the adults come out, they crawl before they try to fly, and the poultry will catch them, and they will scratch up leaves and try to find them. So far as I can find out poultry is the only means of keeping this insect in check.

Now, so far as the cultivation itself is concerned, in stirring up the soil, it does not amount to a row of pins. The moment that you turn over the soil those insects will go straight in, and you can turn it over as much as you wish before they have made their pupa and they will go back into the soil.

One other insect I wish to speak of is a new insect that has just been introduced in the United States. You have heard a good deal about the San Jose scale, and that is known as the most injurious insect so far as fruit is concerned. There is another insect that has got in the United States, known as the West Indies scale, although it did not come from the West Indies. It came from Central America and come up through Mexico. This insect is a scale and affects vegetation of almost all kinds so far as we know; all kinds of fruit trees, forest trees and ornamental trees. It is practically as hard to kill as the San Jose scale, and kills the trees almost as quick when it gets on them. It has only one advantage over the San Jose scale; (you can see it on the piece of bark I hold up here) while the San Jose scale is almost the color of the bark, this scale is white and readily detected. I will have something more to say of this insect when I talk of legislation regarding insects.

AN INVESTIGATION OF ROOT KNOT.

So much has been said lately about the "Root Knot," "Root Gall" or "Crown Gall" that the nursery trade generally have been led to adopt such means as seems best for its protection toward investigating the causes of and remedies for this disease. Reputable nurserymen at present do not claim to grow apple trees without some indications of the disease in their blocks and until some remedy is found to render stocks and grafts immune, the disease will likely continue to prevail wherever trees are grown to any great extent. The disease is much less prevalent than it was years ago in the nurseries. This is in view of the fact that very few, if any, of our commercial establishments are now growing a second crop of apple trees on the same ground.

The writer has had his attention recently called to a small nursery plant that was made on a piece of land which had been an old seedling orchard, one of the "old pioneers." This orchard had been removed probably 10 or 15 years ago. Had really died from old age, apparently, as the trees were probably about 50 years old when the remnant of the orchard was cleaned up. This land was planted in nursery stock and produced the finest crop of Root Knot and Crown Gall that the winter has ever been called on to witness. I make this explanation that it may be understood that it is no new disease, though the agitation of the subject is of recent date.

I will state, frankly, that my investigations on this disease have not been satisfactory to me. There is no question but that the disease appears in most cases at the union of the graft and the scion. Any bruise or wound on either the scion or the root will often produce this disease.

It seems to be in the soil, and so far as has been ascertained, in all soils, both prairie land and timber land. It seems to be wherever trees are grown. It is found on stock from France also. This disease, in my opinion, however, was here before any nursery concern existed. I do not regard it as a *nursery disease*. I wish to make this point clear. It appears in the nursery, but any orchard, in my judgment, produced from seedlings, planted in the orchard, would not be immune any more than trees transplanted from a nursery would be.

The disease in the State of Missouri rarely ever damages to any extent anything but apple trees. In this we are fortunate. In some states it causes considerable loss to other fruit trees. I understand that on the Pacific Coast it is a serious matter with the peach orchardist. In

the State of Missouri I have yet to learn of any loss of peach trees from this disease.

The very best that any nursery can do under the present circumstance is to grade out and burn such trees as may be found showing the appearance of knots or galls.

The statement that some nurseries have this disease in their establishments and that buyers should avoid purchasing their trees from establishments so infested, is somewhat misleading, to say the least.

R. J. BAGBY.

DISTRIBUTION OF FRUIT.

(By G. V. Fowler.)

Mr. Fowler.—I have not prepared a paper, as I was not sure I would come, but Monday evening I set down a few of the remarks that I might make, and further, after talking with Brother Evans, this morning between five and six, while the rest of you were sleeping, I got an inspiration to say a word or two.

Distribution of Apples.—In years like this year I find that you don't need any instructions in regard to distributing your apples. The buyers come after them, and they are ready to take them off of your hands, but they say it is wise in time of peace to prepare for war. So there are some things in connection with the dispensing of fruit, when it is cheap, it is well to consider now. And what some of my friends are doing is culling them on the trees. Mr. Goodman and Mr. Robnet and some others commenced in June to cull on the trees to get rid of the poor ones, and this has a double advantage in producing better fruit and in helping the trees to stand the drouth. This helps the quality and so forth.

We have all heard the adage "that well bought is half sold." Now, well grown is more than half sold, when applied to apples. So, when you spray well and till the ground well and you get a good crop of fruit you don't have to hunt a buyer, but the man comes and buys them; there is nothing to do except the work you have done in producing the crop. A friend of mine in New York, notwithstanding his crop was very light, sold his crop for ten thousand dollars, and the fifth crop he has raised. You can't get him out of the habit of spraying. He is called a crank on that subject by hundreds of people. Ninety-five per cent. of his apples those five years have been good fruit. Some of his neighbors that have not sprayed have grown good apples during that time, but he has grown them every year.

* Now we will commence on apples.—Evaporating: Now, here I would recommend having evaporators and canners and such things as that. In one county in New York it is safe to say that there is an evaporator every mile throughout that whole county, and so they commence just as soon as the apples begin to fall with their evaporating. That has many advantages. It employs plenty of home labor. The fruit is packed in cheap packages and it is cheaply transported, and so there are many advantages in evaporating the apples. Now, in many sections of New York for for the past four or five years, when apples have been higher than usual, I have known them to evaporate their whole crop. I think it would be a better way to evaporate the poor ones and market the finer ones, and so get the better prices. I doubt if they will do that as a regular practice in the future.

Relative to apples, when they are at a low price. I looked up Stewart—I have his book on feeds and feeding, and I find apples rank in value between beets and turnips, and at the present price of grain and other things they would be worth fifteen cents a hundred pounds for feeding purposes to large stock, and yet in New York in 1896 the farmers hauled off thousands of bushels at five cents a hundred pounds. Of course they didn't have the stock and didn't know the value of feeding them, but apples are quite valuable for feeding.

Now we come to picked fruit. This is really the important part of this whole subject. How shall the grower dispose of his hand picked fruit? There is a good deal of fruit that is hand picked that is not good, and now we will say, the evaporator comes in again to handle this poor fruit.

Now, fruit should be put up in an attractive form so as to entice people. One of our traveling men called on a merchant and tried to sell him some lemons. He said, "I don't want any; I won't buy any more until I sell those." He had perhaps a quarter of a box that were exposed to the atmosphere and shriveled up. The traveling man spoke up and says what do want for them? He says, seventy-five cents, and he paid him the seventy-five cents and dumped the lemons into the swill barrel and turned around and sold the man three boxes of lemons, and without doubt those three boxes were disposed of quicker than he did the quarter of a box.

Now we come to the culls. They are always in the way. They are in the way of the grocers. Then the evaporator comes in and we can then save the whole crop.

Now then we come to how to reach the consumer. This is rather a delicate subject for me, an apple buyer to speak of, and only on account of my talk with Col. Evans this morning, would I have been willing to put

down what I have here. Now, in all of the different callings, we engage men who are best adapted to the work we want done. Sometimes apple dealers are not to be had continually at some seasons, and each one must study their own conditions, and do the best they can under the circumstances. Now, I know a man up in Mills county, who said that he didn't have any use for apple buyers, yet there were three buyers there and we were paying eighty cents a bushel for apples. He said he could ship them. I said, of course you can; who are you going to ship them to? He said he had the man's name up to his house, and he wouldn't ship them to a man that he had met, but he shipped them to John Doe in Chicago. He had five carloads, and after shipping the third carload he came around and wanted to sell me the other two. Now, I said to him, "I will tell you something; Thanksgiving when you ought to be having a nice time with your family, you will have a big load on your shoulder." He says, no I won't. I says, all right; next year I am coming through here and you can tell me what was done. They were just soliciting and they got the fruit and they had no further use for him. Over here in Kansas one time there was a man that had eight thousand barrels of apples in his orchard, and he wanted the privilege of selling three or four carloads because he had worked up the trade. Now he says, I won't let them have a barrel without they pay me ten cents extra. So I said let them come around and have what they want. They took eight or ten carloads, and the next season when I met this man, he says, you can have my apples. I says, all right; and he says, you paid me for them, and so did the other firm, says I. "No," he says; "there were three carloads I never got a cent for. * * *

Now I recommend that no matter how small a quantity a solicitor wants, if he only wants five carloads or three carloads sell to him when he suits you, and when a stranger comes in make him furnish you references, and if his references are all right tell him so and deal with him; and if not, tell him so, and don't let them get their work in.

COLD STORAGE FOR FRUITS.

(By Wm. J. Murray, With Armour Packing Co., Kansas City.)

When to pick, how to pack and how to handle fruit for cold storage are certainly questions of much importance to the fruit grower. Judging from our experience in handling fruit packed by the grower for storage, it is surprising how very little attention seemingly has been paid to such matters of the most vital concern. We naturally expect from men

who can talk so intelligently on how to grow fruit, that they will be equally well posted on how to handle and market the fruits of their labor in order to realize the best results. You are in the fruit growing business the same as other men are engaged in other lines of business, to make money. Many, perhaps all of you, have succeeded in raising very fine fruit, but if that is all, you have won but half the battle. The marketing of fruit is of just as much importance, and needs just as much careful consideration as the growing of the fruit; and until you can do both well, you have failed in your endeavor. I do not think I overestimate in saying that for every dollar that you have made by simply growing fruit, some other man has made three or four in knowing how to market that fruit. There are, of course, many exceptions to this statement; but as a general proposition, the fruit grower is a poor salesman.

I shall not attempt to go over the entire field of how to dispose of your fruit to the best advantage; but shall be content if I can give you a few suggestions regarding the proper handling of fruit for cold storage; because without cold storage, there would indeed be but little profit in fruit growing; for by the use of cold storage the fall market is relieved of the glut that would otherwise frequently compel you to sell your fruit for less than the labor it cost you to grade and pack it, to say nothing of freight, commission and incidental expenses.

When to pick apples for cold storage.—There are two things to be avoided in picking apples for cold storage: First, and by all means the most important, fruit must not be fully matured. Second, fruit must not be too green. If you allow fruit to fully mature on the tree, the very best and most perfect cold storage in the country will not carry it for any considerable length of time without heavy shrinkage. On the contrary, if you pick the fruit too green, while it will carry well, it will lack size, color and flavor; and experienced apple dealers will want from fifty cents to one dollar discount per barrel, according to the market. Just when to pick fruit, so it will not be too ripe and so it will not be too green, is sometimes a hard problem. If a man has a large orchard and only a small force to do his work, he will have to commence earlier; and possibly the first fruit he picks will be too green, and the last fruit he picks will be too ripe. He must so plan his work that the bulk of his fruit will be picked about the proper time. We think the heaviest shrinkage we have ever sustained in cold storage, except on windfalls and apples picked off of the ground, was on fruit that seemed to be perfect when it came in, beautiful and highly colored, large and smooth; yet inside of a month or two we noticed that these barrels were slack. Inside of three months the shrinkage was such that they had to be repacked. In four or five

months the shrinkage was something awful. Now, we knew that it could not be the fault of the cold storage, because here was other stock right beside it, in the same room, the same temperature, the same humidity, the same care, the same conditions, and practically no shrinkage. What was the cause of this fruit's not keeping? Nothing more or less than because the apples had been allowed to fully mature on the trees. After an apple has become fully matured, it will stay in a perfect state of preservation for a short time, according to surrounding conditions. Then gradually the process of decay starts in, and cold storage nor anything else that I know of can entirely stop it. By picking apples for storage before they are fully matured, it becomes necessary for these apples to complete their maturity in the cold storage, and because of the very low temperature this completion is a very slow process, taking some time, with some sorts six to eight months; but after the completion of maturity of any apple in cold storage, the process of decay will slowly commence; and while cold storage will retard decay in any stage, it cannot stop it.

There is not any one thing, therefore, that I desire to be more emphatic about than not to pick perfectly ripe fruit for cold storage. It will not pay you, and we do not want it. The best way to handle fruit matured is to put it on the market at once. There is no reason why a man with a small or medium sized orchard cannot pick and pack the greater portion of his fruit without any of it being fully ripe; but in case he cannot, he would better have it a little too green than too ripe. Green fruit will gradually mellow in cold storage, and such varieties as Huntsman and Grimes Golden will gradually change from green in color to a yellowish tinge very much like the natural color of the fruit when ripe. Pen Davis, Winesaps, and other sorts, however, will not change much, if any. It is therefore very desirable that the red apples be allowed to mature as much as possible in order to get the proper color.

How to pick and handle! This is a question I am sure needs very little comment from me, as almost anybody with common sense knows that an apple must be picked by hand; and either placed carefully in a basket on the arm or in a sack over the shoulder. Apples should be handled very carefully from the time they are picked off the tree until they are placed in the barrel. Do not allow them to drop or roll. A break in the skin or a bruise underneath the skin will start decay in that apple much sooner than if it were perfectly free from such defects. The less you handle an apple the better. I would therefore suggest that they be not piled on the ground and then be rehandled to the apple table; but that the pickers bring their apples direct to the table from which they

go into the barrel. I have seen apples packed in the orchard and by the way, do not think of packing anywhere except in the orchard for cold storage. The hauling of apples in wagons a half a mile to a packing barn or some other place bruises more or less of the fruit. As I started to say, I have seen apples packed in the orchard where, after the barrel was faced, the apples were allowed to drop from the top of the table to the bottom of the barrel, just as many as could go through the opening at the end of the table at a time. You should have a gunny sack arrangement so that whenever the packer gets half a bushel of apples in the gunny sack, it can be lowered gently into the bottom of the barrel, opened up and raised to the top for another load. As the barrel is gradually filled, it can be shaken gently; but very gently, just enough so that the apples will settle to a natural resting place. Too hard shaking is likely to bruise some of the fruit. When the barrel is nearly full, use smaller sized apples for the pressed end. Smaller apples will fit in better, and they are not so easily mashed in the pressing. Softer varieties, such as Jonathans should be pressed very little; otherwise you will damage considerable of the fruit. We have opened up barrels of apples in cold storage and dug down into them and found a couple of dozen of fine large apples that had been bruised by being pressed too tightly in the barrels. This is frequently a common fault with fancy soft apples, especially when they are nearly ripe.

Some of you probably wonder why I lay so much emphasis on the careful handling of fruit during the picking and packing. I want to say to you that what I have said regarding the necessity of careful handling of apples is true of almost every other commodity that goes into cold storage. Why, there is not anything that we get such poor results from in cold storage as fruit, eggs, potatoes, cabbage, celery, and many other commodities that have been roughly handled. Take an egg, for instance. Better put a rotten egg in storage in a case of good eggs than a cracked egg; because the shell of the rotten egg being in perfect condition, that one egg will not contaminate other eggs around about it; whereas the egg with the cracked shell, while it may have been perfectly fresh and sweet when it went into cold storage, will soon decay and on account of its shell being cracked affect the eggs surrounding it.

After your apples are packed, they should be hauled immediately to the car, or else placed in a barn or other building, under shelter, and sent to the cold storage rooms as soon as possible. If you are compelled to hold your fruit after being barreled four, five or six days before shipping, keep stock as much as possible in a room of even temperature and free from excessive dampness. Your barrels, after being filled should especially be protected from rain. Now it occurs to me that I said

nothing about another matter of the same character; that is, apples should not be wet when packed. It is poor policy to pick more than what fruit you can pack the same day as picked. If you have a very heavy dew and the apples are wet in the morning, they should be allowed to dry off on the apple table before going into the barrel. Now, I know what a great many, possibly not a great many, but some packers as well as growers of fruit will say to this and other points that I have mentioned. They will say: "Why, I have packed apples just after a rain when the fruit was wet, and it never hurt them a bit. I have had apples piled on the ground two days before being put in the barrels, and it never hurt them a bit. Why, I let my barrels stay in the orchards for a week before shipping, being subjected to the hot sun in the day and the heavy dews at night, and it never hurt them a bit."

While I am willing to admit that all these things that I have mentioned do not always seemingly hurt the fruit; yet there is no question but what if these little details are carefully looked after, your general results will be much better. It is hard to convince a man whose fruit has been in storage six months and is sold at a loss on account of heavy shrinkage, that it was too ripe when put in; or that the fruit was not well and carefully handled when picked. I would rather say now to any prospective cold storage customers that the best results are obtained from using the best judgment as to when to pick and the most careful handling of your fruit, than to try to explain afterwards for any heavy shrinkages. There is no state secret about cold storage, and any reputable house with modern facilities should be able to furnish the very best of cold storage. Perfect cold storage for apples simply means uniform temperature of from 32 to 34 degrees, and a room free from excessive moisture. There should also be sufficient circulation of air to carry off gases that naturally arise from some decaying fruit. Then the fruit should be handled carefully in and out. Barrels should not be rolled; but placed on trucks at the car, and trucked to the place where they are piled. After they are once piled, they should never be taken down except for inspection, until they are ready to go out. These are rules that we have always observed, and we have had the very best success with fruit that was properly handled and packed for storage.

Before closing, allow me to call your attention to the growing demand for apples packed in bushel boxes. Several years ago only very fancy sorts were packed this way. Now on a great many markets any apple packed in boxes will bring relatively more money and sell better than when packed in barrels. They are easier handled, permit of more careful inspection of the fruit, are just as economical as regards cost of package and labor, and find ready sale amongst a class of people who

cannot afford to invest the amount of money necessary to purchase a barrel.

In packing apples in boxes, they should be carefully selected as to uniformity of size and packed in tiers; not simply faced and then put in as you do in a barrel. It is the writer's opinion that boxed apples will keep better than barreled apples, for the reason that there is less pressure on the individual apples; they are handled more carefully, and the cold penetrates more quickly to the center of the package.

The question of wrapping apples for cold storage is one that I would like to take up with you; but do not feel justified in doing so at this time, as experiments along this line have not been conducted far enough for me to make any positive statements as to the increased cost of such package as compared with the market value, difference in shrinkage, any many other points; but if I had some fruit of fancy sorts, such as Wine-saps, Jonathans, Grimes Golden, Huntsman, etc., that were well colored, large perfect fruit, I would pack them in boxes, wrap each apple first with tissue paper and then with parchment paper. I trust, however, another year to be able to give some very complete results along this line, as the government is making exhaustive experiments in our cold storage.

I trust I have at least stated some one fact that will be of value to some one person, and realize that many will differ from me regarding some of the statements.

QUESTIONS ANSWERED.

Question: Will the stripping off the leaves from young nursery stock taken up in autumn injure or weaken them in any way?

Mr. Augustine: Not when the stock is thoroughly ripe, but it will injure it unless the stock is thoroughly matured.

Question: Are not thousands of dollars lost annually by planting fruit trees dug in the autumn and stored or piled up in store houses and delivered in the spring?

President Murray: As there seems to be no one to answer that question, I want to say that in conversation with one of the leading nurserymen of the State of Missouri, who came back from the National Nurserymen's Convention, that he reported to me that it was a conceded fact that every week or month that the young nursery stock was out of the ground and the roots stored away in these storage houses, they deteriorated quite a little in vitality, and that they didn't start out with the vigor of well planted trees.

Question: Do you think they would deteriorate if they were heeled in the ground properly, out of doors, I mean?

President Murray: Not so much if they were properly healed up; if they were taken up before they were matured, nothing would keep them up. I think if they were properly healed down they would keep all right.

Mr. Marshall: My opinion is, that in this form of country they appreciate that sort of care; that they do well when under the ground and away from our bleak winds, and stand it much better than they would if they stood in the ground. I have had about 14 years' experience in the work.

Mr. Augustine: The peach tree north of this latitude can be kept nowhere else successfully except in a cellar. You can't bury it and keep it successfully, and you cannot leave it stand out and take it up in the spring and make a success of it in four winters out of five. I would not plant a peach tree that was left outside, north of this latitude and transplanted in the spring, nor would I bury it in the fall and plant it, because it is full of water.

Mr. Wilson of Iowa: I wish to state, my experience in regard to storing trees in the winter depends upon how they are stored. If they are kept in a warm cellar, I am inclined to think it does tend to reduce the vitality. A few years ago I had a great deal of experience in fall digging and burying down apple trees, because I believed it preserved the vitality much better than for the trees to be dug, and I had a letter from a gentleman in Montana, who was a former Iowa citizen, and he wrote me that he wanted to place an order for forty-three thousand trees, all apple trees two years old and wanted one condition to be in that order, that they must be spring dug trees. I said very well, I will agree that they will all be dug out of the ground in the spring; that was my reply and I recorded the letter. He made the order and I dug all of his trees out of the nursery the last week in October, and the first two weeks in November, after they had fully matured, and bedded them down, and in the spring I dug them all out as I had agreed to do in writing, and shipped them to this party, and in six weeks after he had received them, he wrote me that there never had been trees come to that country that were so strong and vigorous as those trees, and he said this more than ever demonstrates the correctness of spring digging. Now the point I wish to make is this: That the digging and bedding of the tree in our climate further north preserves the vitality of the tree to a better advantage, than if it stands out and goes through the freezing and thawing processes of the winter, which as you all know tends to reduce the vitality of the tree. But it may not be so much so here as in Iowa, and I am satisfied that if I was going to sell a man ten thousand trees and guarantee every one of them to grow, I would certainly reserve

the right to dig those trees the last week in October, or the first two weeks in November, and heel them under in clean earth. Now you can store trees in caves or cellars in the same way if you could have the roots all up, and leave it cold enough for them to freeze; let the thermometer get down five to ten degrees below freezing and open up your ventilator, and when it gets very cold close up your ventilator, but keep that place cold and your trees will retain that vitality; that has been my experience.

Question: Are the Elberta and Elberta Queen the same peach?

Mr. Evans: There is no such thing as an Elberta Queen. Certain people call the Elberta, the Elberta Queen or the queen of peaches. That is how I suppose that comes around.

Question: Is there an Elberta Cling?

Mr. Evans: No.

Question: Are the Benoni and the Red June the same apple?

Sec. Goodman: No.

Question: What color is the Winter Banana, and would you advise planting it?

Sec. Goodman: The Winter Banana is an apple, I think, we named the Banana at the meeting we had at Warrensburg; the yellow apple that resembles the Huntsman or Grimes Golden. That has never been used very much.

Question: What about cutting limbs off of trees, limbs three to four inches through?

Sec. Goodman: No; better not do that.

J. J. Bartram.—When agents sell apple trees grafted above the ground, claiming that they use the whole seedling for one tree, and that is the only way to get a long lived tree, why do then nursery men deliver trees grafted with scion 6 to 7 inches and the seedling root 5 to 6 inches long?

Chas. F. Langtim.—Is there any difference in the productiveness of two apple trees, one grafted with a scion taken from trimmings of nursery stock and one grafted with a scion taken from old and bearing tree? In what degree are the bearing qualities of the tree, produced from scion of nursery stock, affected, if any? Does it produce a tree of shy bearing qualities, or late bearing qualities? Or does it have a tendency to produce a tree almost barren, other things being equal? If not, how can I account for the failure of my Ben Davis trees to bear, now 14 years old? Have not produced one bushel per tree for all the past four years. I have as fine trees as any, but they do not bear.

Mr. Wood.—I will just say a word in regard to a Ben Davis

orchard. Now I have a Ben Davis orchard of about 8 or 10 acres. There are some Winesaps and some Jonathan in it. I haven't had a fair crop of apples in the last four years. Now I wish to know what is the matter. I have thoroughly taken care of my orchard, sown it with clover, and it has been cultivated, and I have had good crops heretofore, but in the last four years I have not had a good merchantable crop, that I would consider one-fourth or one-fifth of a crop.

President Murray.—I want to say one word in regard to the unfruitful orchards in Northwest Missouri. We are going to have to root prune very severely or girdle in order to make them develop more fruit buds. I think our trees here grow too much to wood, and we have got to use a good deal of common sense and observe conditions, surroundings, and be governed accordingly.

Thereupon convention took a recess until 8 p. m.

WEDNESDAY, 8 p. m.

For the entertainment of the evening, music and recitations were given by a number of young people of the city.

CANNA CULTURE.

(By R. G. Rau, Superintendent of Parks, St. Joseph, Mo.)

The growing of Cannas is very simple, but still all little points of detail have to be worked out well, these make all plant cultivation successful, and create the specialist.

We start about the 15th of February to divide the bulbs, and pot out like other florists 4 or 5 strong, large, sprouts in 5 and 6-inch pots, leaving part of the live roots on. After potting in rich loam, we keep the Cannas in a warm, sunny greenhouse, with a night temperature of not less than 60 degrees, and during the day not less than 80 degrees. After this the Cannas have to be kept wet at all times. In order to grow strong plants give as much room between same as possible. It is well enough to plant out Cannas in bloom, but the flowers don't last long, and large growth is also not as valuable as low, strong sprouts. After middle of May we plant the Cannas out of doors in rich, well prepared soil, from 18 to 24 inches apart in large beds, in small beds 12 inches. Plant fairly deep to have all the bulbs well covered, and then at once saturate the ground, which should be repeated every week during dry weather. Soon after the planting we

cover the ground with 3 inches of any kind of manure, which is to be covered with lawn clippings, to hide the bad appearance of same. Always plant while the ground is dry, and loosen it up again before mulching. The mulch serves better than working the ground. It keeps the sun from burning and baking the beds, and at the same time furnishes feed. A few years ago I was in Chicago, laughed at when I told we take off the dead flowers on Cannas. But as soon as the first crop of flowers is over and the seed starts to develop, the flowers become weak and small, or stop blooming, and also make a poor appearance. You will also find the same with other plants. Taking off the dead flowers, watering and manuring are the chief points for successful Canna culture. If this is followed right, the beds will be in bloom soon after planting time, until fall, when the frost cuts every thing down. In fall we dig up the bulbs with all the soil, which will stay with them, and winter them in a warm place, where they receive a watering about every three weeks, to keep the bulbs from drying up. For our section is it best to plow the mulch on the beds under in fall. Cannas will do better in large beds than in small ones, or in narrow borders. Nearly all Cannas, with a few exceptions, grow tall, and about the same size, under a first-class cultivation.

The selection of varieties has about as much to do with having nice Canna beds as the culture, and some of the best kinds we know of are following ones: About the best one is *Mad. Crozy*, the oldest of the large flowering Cannas, which I was the first to grow in the city. The color is bright scarlet with gilt edge. Some brighter is *Paolo Radelli*, which is a weak grower. *Queen Charlotte* has a broader gilt edge. *Florence Vaughan* still holds its own. It is a good yellow with scarlet spots. *Golden Bedder* is a dwarf, pure yellow with small flowers. For deep carmin we use *Alphonse Bouviers*, and discarded *Chas. Henderson* for its blooming so late. *President McKinley* and *President Cleveland* have a good color, but sunburn some. For bronze leaved ones we grow *America*, *La France*, *Egendale* and *Assets Red*. The last one has poor flowers but the best bronze foliage. We discarded all the orchid flowering Cannas but *Suavia*, which has the largest flowers of all, on account of sunburning. The new hybrids *Pennsylvania* and *Kate Gray* are a little improvement on the old orchid flowering ones, but sunburn some also. Other good new ones are *Rosemary*, a prolific bloomer of a beautiful pink. *Striped Beauty*, *Mottled Queen*, *West Grove*, a magnificent scarlet dwarf, *Mdm. A. Blanc* a good orange, *Golden Standard*, *Betsey Ross* of a fine orange, *Leopart*, and *Niagara*. Besides them we tested some more new varieties, of which we will discard more than half after the second year's trial.

CITY FORESTRY.

(By L. A. Goodman, Kansas City, Mo.)

Who plows a field or trains a flower,
Or plants a tree is more than all.
Kind hearts are the gardens,
Kind thoughts are the roots,
Kind words are the blossoms,
Kind deeds are the fruits.
He who plants a tree,
Plants a hope.
Canst thou prophesy, thou little tree,
What the glories of thy boughs shall be?

A quarter of a century ago it would have been easy to have settled this matter in many parts of the city and especially so on these rocky hills and deep ravines. All these hills and valleys were covered with some of the most beautiful forests known to this western land. The elms and oaks, in a dozen varieties, the walnut, and hickory as fruit producers, the linden and willows giving honey to the wild bees, the maples hard, soft, sugar, and white, growing beautifully everywhere, the sycamore, ash, wild cherry, cottonwood, hackberry, coffee bean, the thorn and crab apple with their beautiful flowers and delightful, pungent fruit, the box elder, and in some places the tulip tree. All these magnificent trees interspersed with an endless variety of shrubs and vines and plants and wild flowers would have made it easy for one to settle this matter of City Forestry with the greatest of satisfaction.

It does seem a pity that these western Americans have so little regard for the trees in and about our large cities. Beyond this, it is still more deplorable to see how quick our city fathers have been to destroy every tree that stood anywhere near a street or side walk no matter if it be a forest tree planted by nature and grown for hundreds of years, or if it be one planted by the owner of the lot and cared for until it becomes like one of the family, if it only stands one foot in the way of a street or sidewalk, out it must come. So I plead with you to use all your influence and power and authority to prevent the further destruction of these few grand and noble trees of the forest, or those trees that have been planted by the hand of the tree lover. We must keep in mind the fact that we have the same right to prevent cruelty to trees as we have cruelty to animals.

Woodman, spare that tree,
Touch not a single bough;
In youth it sheltered me
And I'll protect it now."

What has been done cannot be helped now but what we may do by carefully guarding our treasures, "the priceless trees," and by preserving religiously every one of them is a matter in which we are all deeply interested. There are many of these beautiful hillsides and valleys and creek bottoms in and about our city, which are still worthy of our attention and preservation. Trees as old as this nation, yes trees which were in these valleys when the Pilgrim Fathers landed at Plymouth Rock, or perhaps when the foot of the first white man stepped upon this land, are of such wonderful beauty and size that we must surely revere and protect them. There are elms in the Brush Creek valley which measure twelve to fifteen feet in circumference and the spread of the branches over one hundred feet. There are beautiful dells and vales, rocky knolls and steep hillsides, high bluffs and glorious hills, grand springs and lovely creeks which are still covered with the native forests that are of untold value for future beauty and they must be preserved. Thus says the poet concerning the old hemlock on the eastern hills.

But I! For six hundred rolling years I have stood like a watch tower, I—
I have counted the slow procession of centuries circling by!
I have looked at the sun unblenching, I have numbered the midnight stars,
Nor quailed when the fiery serpent leaped from its cloudy bars!

Or, ere ye were a nation or your Commonwealth was born,
I stood on this breezy hilltop, fronting the hills of morn,
In the strength of my prime uplifting my head above meaner things,
Till only the strong winds reached it, or the wild birds' sweeping wings.

He builded his towns and cities, and his mansions fine and fair,
And slowly his fertile meadows grew wide in the tranquil air,
He stretched his iron pathways from the mountains to the sea,
But little cared I for his handiwork! 'Twas the One Great God made me.

I have but to point you to the beautiful Fairmount Park, and the Wissahickon river out of Philadelphia, where you may revel in the beauty of nature's forests in which has never been the ax of the woodman. Within a few miles of the capitol of our nation there are hundreds of acres of the native woods in all of their wild beauty, and these places are being preserved with a religious zeal and determination.

How much more should we reserve and preserve some of the grandest spots about our new city. Then there are noted trees on some of these old homesteads and on some of these hills which should always be cherished for their age and beauty. To awaken your enthusiasm I wish to refer you to a book of plates "Some of the Noted Trees about Boston," giving the age, size and spread of branches of the wonders of tree growth.

If I only could write the color
Of the lilac's tossing plumes,
And make you feel, in a sentence,
The spell of its sweet perfumes;
If my pen could paint the glory
Of the blue and tender sky,
And the peace that crowns the mountains,
My poem would never die!

A society for the preservation and improvement of our natural beauty spots and waste places is something to be desired right here in this city. But the probability that this will hardly be accomplished soon shows the greater necessity of something being done now, ere we lose more of our natural beauty, and so I appeal to this large and influential club to help create a sentiment in this matter. There is nothing more delightful than this study of tree growth and nature's beauty and nothing so productive of good for the future. I plead with you therefore, for your assistance, for your influence, for your authority, to help create a love for trees and awaken such an enthusiasm for the preservation of what we have and the planting of more; that no one will dare to deface, injure or destroy any of them in the future.

Forestry in its true sense means to get the most trees in number per acre that the land can grow, with the idea of getting body growth and as few branches as possible. But City Forestry means to get all the leaf growth, all the shade, all the broad branches all the spreading top that we can secure on the ground with the least number of trees. Twenty-five years ago the greatest landscape gardener of the West, M. G. Kern, who laid out Lafayette Park and Forest Park in St. Louis, went with me over these hills in and about Kansas City, and then outlined a most beautiful landscape and park effect. Such a plan might then be put in working order and the preservation of these grand monarchs of the forest be accomplished.

Let us then at this late day begin to protect every tree we can and plant every tree we can, with this idea in view, the covering of our city with a leafy growth of trees.

What do we plant when we plant the trees?
We plant the houses for you and me,
We plant the rafters, the floors,
We plant the studding, the laths, the doors,
The beams, the siding, all parts that be,
We plant the house when we plant the tree.

City forestry, meaning therefore, the beautifying of our streets and lawns, and waste places with a leafy covering, you see will give too much for this one paper, and I will only discuss ornamental and forest tree growth. What then can we make our city by planting?

We know that it takes years to develop these forest trees and we must always keep in mind, therefore, what the trees will be in twenty, forty, or one hundred years hence. We must remember also that we do not want tall bodies as the trees get old, with the leafy surface forty feet from the ground, as in real forests, but we want this leaf protection as close to the ground as possible, so we can walk or drive under.

First. By street planting. All street planting should be of one variety on the street, for permanent trees. Some other varieties may be planted between with the idea of removing as soon as they get too close or the branches interfere. The permanent trees should not be planted closer than fifty or sixty feet. Of course this will necessitate one between them for at least ten or fifteen years, especially if the permanent tree is to be a hard or soft maple. These extra trees are to be used as fillers only, and are to be cut out as soon as they begin to crowd the others. The only danger lies in the failure of the party to thin out. If you can cut out when the time comes, then so plant.

Second. Planting in the waste places, hollows, ravines, corners, or nooks. Many of these may be secured by the city for the asking. Some of them have had the taxes accrue against them and they have been forfeited to the city. In some of our cities these waste places are planted with a clump of forest trees simply for the covering or hiding of undesirable objects and the giving of leaf surface instead of the barren spots.

On many of our waste places nature soon plants a young forest of her own if you will just let her alone and protect the young seedling as they come up. Note an instance of this on the east side of Grand avenue, south of 24th street, in the old quarry, where is a wonderful growth of young elms which make us think of the words of the poet :

The elm a lovely lady is,
In shimmering robes of gold,
They catch the sunlight when she moves,
And glisten fold on fold.

These trees in a few years, if protected, will entirely cover the old barren, unsightly places with a young forest that will be a thing of beauty.

Third. Plan will be to do a lot of group planting at corners or in large lawns or back yards so that it may break the monotony of the regular lines of street trees. In the city of Washington we find this plan utilized to its best advantage. Whenever there is a little three cornered plot at the intersection of streets it is covered with a group of forest or ornamental trees, and it becomes a wonderful relief to the long rows of street trees. We have many large lawns or back

or side yards where such grouping can be most profitably and advantageously done without a dollar of expense to the city, if we will but call the attention of the owner to its beauty and value.

What do we plant when we plant the tree?
A thousand things that we daily see:
We plant the staff of our country's flag.
We plant the shade from the hot sun free—
We plant all these when we plant the tree."

In this planting, therefore, we want to understand the nature of the tree. What it is, how it grows, what are its working parts, how it eats and drink and sleeps. First of all then we must ever remember that the tree is alive. It is alive, and because it cannot move, like our dumb animals, and cannot talk like our children, yet it is none the less alive, and it will bend in obedience like our dogs and respond in answering our questions like our children if we can only understand its talk.

"The breeze-like music wandering o'er the boughs,
Each tree a natural harp—each different leaf
A different note, blent in one vast thanksgiving."

The working parts of the tree, and the talking parts also, are the roots, branches and leaves, and if we follow nature in the treatment of these, listen to the pleadings of these trees, and answer them, then we will see the result in vigorous, thrifty growth and abundant healthful shade. But if we injure or abuse them, they suffer as does our horse under mistreatment. If they could, most of our trees would spend a large share of their time in weeping over their injuries as does the child when abused.

"Little flowers, if I could understand
What you are, root and all, all in all,
I would understand what God and man is."

Do you think this an idle tale, then go to the various sensitive plants and see how quickly they will shrink from the slightest touch, or examine the weeping trees of Australia and see the tears they shed from abuse or neglect. So I say in a mild way do all our trees suffer from neglect, from carelessness, from ignorance, from abuse, from injuries. If we will but always remember this we will have less dead and dying trees on our streets.

"But, lest some of you doubt them,
I'll whisper the secret, now, seeing it is you—
I've tried them and know all about them."

The roots need to be in the ground and the tree needs all of its roots, and so when we take up a tree we must take up all the roots we can get, and we must keep them in as near the condition they are while in the ground as can possibly be done. You might just as well expect a fish to live out of water as a tree to live with its roots lying

in the full sunlight on a hot day or out of the ground during a frosty night.

The tree begins to suffer, in fact it begins to die just as soon as the roots are out of the ground and it is only a question of how long it will be before it is dead. More than nine-tenths of our trees are lost by this exposure of the roots, and the trees are really dead before planting, although they may not show it until months after. It is not like Rome, which took 700 years to die, but it does sometimes take the tree seven months to show it cannot live.

The tops, body and branches begin to suffer in just the same way, but not so quickly. The branches are evaporating moisture all the time and if the roots are not able to supply it they at once begin to shrivel up and it is only a question of how long before the tree will be ruined. Again in the handling of these trees the bark is often raised and broken from the bodies and branches and if the trees could cry out they would do so just as quickly as you would when the skin is torn from your hand or arm or face. Then in order to cover these various injuries the "tree butcher" will cut off all of the tops of the trees and leave nothing but the poles. The trees need good roots and branches and young twigs to begin the foundation of the other working part, the leaves which are the pumping force of the tree, the transformer of the sap from the roots into twig growth and the producer of a layer of wood on the outside of the tree.

How can the tree do this if there are no leaves until midsummer as is too often the case when there are nothing but poles, instead of tree tops. These branches and leaves are like you, they have pure air; trees cannot thrive well otherwise. The scraggy appearance of so many of our trees in this city is due to the soft coal smoke, and you may as well expect to keep healthy and rosy cheeked in a dungeon, as a tree to be healthy and vigorous with soft coal smoke in the air.

You would die also if your feet were planted like the tree so you could not move and get pure air part of the time at least.

Trees love society, they do better in groups, grow more vigorous when they protect each other from the hot winds of the summer, and colds of the winter. They love attention and respond in their own to every care and attention given them. Do you love trees? then they will grow for you, they will live better if you plant them, they will answer you with increased loveliness for every particle of food you give them, for every drop of water you give them to drink, and every washing or cleansing you give their bodies, just as much and just as certainly and just as intelligently as does any horse or dog or cat.

Do you love trees? then try them and see and you will get a thousand times the pleasure out of them, you can talk with them more intelligently and receive a hundred times more reward for the love expended upon them in return, than you or any living man or woman can get from a pet poodle dog, fox hound, or pug dog in a thousand years, and those who live after you will call you blessed.

"Set some trees on the commons,
Ashes, linden, poplars, birch,
Set them out around the school house,
Plant them thick about the church.
Have the children's play ground shaded,
And the public walks as well,
And the joys from these arising
Coming ages glad will tell.

This tree planting means much more to all of us than the pleasure we get out of them or those who come after us will get. These trees are a plan of nature to modify the heat of summer and the cold of winter. Our delight on a hot summer day is under the shade of the trees and the modifying of the winter blasts by the forests is just as perceptible to you if you seek their shelter. The trees help to regulate our rainfalls and our moisture and every city and town and village should be a city forest just so far as it is possible.

We should have leaf growth of any and every and all kinds for our pleasure and profit and health, and for its influence on the climate and rainfall. Without these forests we should have the desert wastes described by the poet.

"The forest trees that in the olden times,
The peoples glory and the poets pride
Tempered the air and guarded well the earth,
And under spreading boughs for ages kept
Great reservoirs to hold the snow and rain,
From which the moisture through the teeming years
Flowed equally but freely — all were gone,
Their priceless leaves exchanged for petty cash;
The cash has melted and had left no sign,
The logger and the lumberman are dead,
The ax has rusted out for lack of use,
But all the endless evil they had done
Was manifest upon the desert waste.

The home of the birds. I was at Marshall, Mo., the other day in the campus of the college grounds among the beautiful trees and the president said to me that the trees were becoming a birds paradise and his whole trouble during the summer was to keep the boys and men from killing the birds and destroying the nests. Not the least, therefore, of the many benefits of the tree planting is the place we give the birds for their homes, plenty of beautiful forest trees in which to make their nests, after having destroyed their native habitat, the natural forests.

The farmers and fruit growers realize more and more each day the need of birds as assistants in keeping the insects in check.

This tree planting in all of our cities will thus be of untold value to the agriculturist. Birds are one of the plans of nature to give us sweet songs and also protect us from our enemies.

I plead, therefore, in this matter for protection to our birds. They are beautiful in our trees, but not on hats. They are valuable in our forests, but not on our tables. They are happy when on their nests, but not when the nests are in the boys hats.

Think of your woods and orchards without birds!
 Of empty nests that cling to boughs and beams,
 As in an idiots brain remembered words
 Hang empty mid the cobwebs of his dreams!
 What bleat of flocks or bellowing of herds
 Make up for the lost music, when your teams
 Drag home the stingy harvest, and no more
 The feathered gleaners follow to your door?
 What would you rather see the incessant stir
 Of insects in the windrows of the hay,
 And hear the locust and the grasshopper
 Their melancholy hurdy-gurdies play?
 Is this more pleasant to you than the whir
 Of meadow lark, and her sweet roundelay,
 Of twitter of little field-fares, as you take
 Your nooning in the shade of bush and brake?

They are industrious after insects if we give them the trees for homes, but they flee far away when there are no forests or city trees to protect them. They are our best friends in the woods and fields but not when murdered by the ruthless hand of the man with the gun. Let us plant trees for the birds.

Nature surely has no more delightful phase of pleasure or profit or investigation than has this same tree planting or "City forestry."

First. It creates a love for the trees so that we can talk or commune with them to our hearts content. You know how much more you enjoy society when you are well acquainted with every person present, do you not? Well just so do I plead for a knowledge of our trees. Know them, get acquainted with them, see their characteristics in summer, in winter, know the leaves, the twigs, the bark, the roots, know them by name just as you know your friends by name and call them such. "Our friends the trees."

"The book for every one to read is the open book of nature. There was none ever written that contains one-half of the information, none other half so fascinating, none so perfect and so pure.

"Nature teaches us to dwell as much as possible upon the beautiful and good, and to ignore at all times the evil and the false. Let us take a single tree for an object lesson, and see what it will teach us.

Time will not permit of our discussing the phenomena of plant life, we will only say that vegetable and animal lives in no way differ in principle, there is a perfect analogy between the two. But in order to show you the pleasure that is to be derived from the study of the tree, we would say that all the plants possess a real life, they eat, drink, feed and think, they sleep, breathe and secrete, in short perform all the functions of supply, repair, development and reproduction."

Can you go into the woods and name one-half the varieties of forest trees? Then is it any wonder that you do not love the trees? Can you love people and not know them? Know the different members of one family not one member only. Such, for instance, as the family of oaks, black, white, red, brown, spanish, and so on or the family of elms. If you do not know them thus then you loose half, if not all, the pleasure of the study of our forests. Nature study in this direction is a delight, a recreation, as well as a good lesson to all of us if we will but make use of it. We can see beauty in every leaf and bud and branch and variety and when the leaves have fallen then in the twigs and branches and bark and lichens that grow thereon.

Nature in and among our trees and the growth of these trees is a valuable, delightful, interesting and profitable study as is any science.

He who plants a tree,
He plants love.
Tents of coolness spreading out
Above wayfarers he may not live to see.
Gifts that grow, are best;
Hands that bless, are blest;
Plant! life does the rest.
Heaven and earth helps him who plants a tree,
And his work its own reward shall see."

What is science? I know not what you think, but in my humble opinion science is "seeing things that you look at and drawing conclusions from what you see." Can you apply this to our trees and tree planting? Then you will become a scientific forester. If you thus love nature-study and follow it you will always be ready to protect the trees, young and old, planted or being planted, protect them:

First. From our city authorities, shame to them be it said.

Second. From our tree butchers, who cut them to pieces.

Third. From our telephone and electric light companies, when they want to run a wire over or among them.

Fourth. From the man who hitches horses to them and lets the bark be peeled off.

Fifth. From the careless boys.

Sixth. From the ignorant owner.

Seventh. From the horses and cattle that run at large.

A few practical thoughts in the line of growing and planting and handling trees.

First. The best trees are grown in the nursery from seeds, and there well cared for, headed at the proper height and, where necessary, transplanted once or twice or thrice before planting out in its permanent home. All trees are much more valuable when thus transplanted.

Second. Trees must be taken up with plenty of roots, about one foot in diameter for every inch the tree is in diameter at the crown of the roots.

Third. Handle so that they will not be exposed to the air any longer than absolutely necessary, cover all roots with wet straw or wet sacks as soon as dug. Do not bruise root or top.

Fourth. Pruning, trim so that there will always be some of the one-year-old wood left on the tree. Cut back tops so that it will compensate for the roots cut off.

Fifth. In lawn planting always plant in clumps or groups. The beauties of the tree are much more prominent when broad patches of green grass intervene between the clumps of trees. It makes a setting for the trees a frame work for the picture. This is always a safe, sure, and satisfactory plan.

Another great mistake is in thinking that trees are not beautiful until they become large. There is just as much beauty and sometimes I think more too, in small shapely, thrifty, vigorous growing trees, be it apple, pear, peach, maple, elm, evergreen or shrub, than there is in the full grown specimens. To a lover of trees, the beauty and pleasure they give is a continual one, the first of spring, the middle of summer, the autumn or the winter, all have their attraction.

Sixth. The plan of pruning is to have an ideal tree always in mind. What is an ideal? I think it is one with a center trunk with all the branches coming out of the main trunk at as near right angles as possible and scattered all along the entire trunk.

Keep the main center stem longer than any of the others and prune in a rather pyramidal form. All trees thus pruned will make a symmetrical growth and you will hardly have forks to split or break downs by heavy winds or snow or ice. Something in the shape of a Norway spruce is near the plant I like to carry in my mind. I know it is hard to realize this ideal in many of our trees, but if we will have it in mind all the time we will gradually bring the tree to its ideal in a few years. I have a soft maple in my back yard that is

thirty years old. Trunk six feet around, fifty feet high, branches and spread seventy feet, and has never been injured by snow or storm. And sugar maples that at one-third of a century are perfect marvels of beauty.

Seventh. Plant thickly so as to get immediate effect and then chop out when they are too thick, and do not be afraid to do it in time. I fear to recommend this rule because so many will fail to do the cutting out in time.

8th. In street trees plant them so that they will occupy the middle of the grass plot between the sidewalk and the curb. These granatoid men will come and cut down the roots from a lot of trees that have been planted twenty years, to within one foot of the tree, taking off all the roots for a depth of twelve to fifteen inches. A perfect outrage and a barbarous practice sanctioned by our city fathers, it should be prohibited by every person with the least bit of sense.

Ninth. Planting should be made in holes large enough and deep enough to hold the roots in a natural position. Do not plant any deeper than the tree stood in the nursery. Put well pulverized soil around the roots so that every root will be in contact with the soil and then tramp the soil down well.

When shall we plant? Whenever we can find the ground in good condition, spring or fall.

Some say to plant trees in the spring,
And some say in the fall,
But the worst are those who compromise,
And plant on trees at all.

Eleventh. The care during the first and second years is to hoe the trees well and often or mulch them well with rotten straw or old manure. Pruning with the ideal tree in mind, taking off only such twigs or branches as are getting out of the way and destroying the symmetry on tree.

Twelfth. Protect the bodies of the trees, especially of large trees, by wrapping them with old gunny sacking or hay rope. This will prevent sunscald and keep out the flat-headed borer, and insure a good growth the first year.

Thirteenth. Pruning in after years needs be only such as will preserve the beauty and the symmetry of the tree, keeping the same ideal in mind and cutting back about one-half of the year's growth in the case of soft maple and elm and that class of tree. For a lawn tree of peculiar beauty it is often desirable to have the tree branch at the ground like the spruces. This is true of some birches and beeches and it makes a very striking feature in the landscape.

Fourteenth. It is always desirable to preserve the individuality

of our trees. It is just as distinct as is the individuality of each person in this room, and we lose one-half of our attractiveness when we lose this characteristic. Just so with the trees, no two are just alike and it is always well to preserve these distinctions and so it is necessary often to cut out surplus trees in order that we may retain this individuality of each variety. Our tree well shaped and covering 50 or 100 feet of ground with its branches, is much more grand than the same space covered by a clump of a half dozen. On my home place I have cut out more than three times as many trees as I have left and have thus retained the individuality of the trees.

The elm, for instance, varies greatly from the tall, upright to the low, crooked, scraggly, drooping branches and it is absurd to try and modify them by a variety of treatment, but treat them so as to induce this peculiarity in each.

VARIETIES FOR DIVERSE USES.

1. For street trees.—Elm, sugar maple, Norway maple, Tulip, linden, white ash, box elder, soft maple, sycamore, poplar, oaks.

2. For lawns.—The same as above and birch, beach, larch, alder, cypress, coffee tree, magnolia, oak, willow, sweet gum, sassafras, weeping trees, elm, birch, beach, teas mulberry, Mt. ash, willow.

3. For small places.—Mt. ash, thorn, beech, horse chesnut, mulberry, magnolia, Japan maples, maiden hair tree.

4. For color of foliage.—Purple leaved beech, birch, plum, elm, white leaf linden, scarlet maple, Japan maples, yellow and red leaved oak.

5. For flowers.—Double thorn and crab apple, double cherry, acacia, magnolia, honey locust, catalpa, horse chestnut, dogwood, large white and pink.

6. For resistance to smoke.—Sycamore, ash, mulberry, coffee tree, hackberry.

7. For fruiting.—Crab apple, red hawthorn, wild cherry, Mt. ash, persimmons, Russian olive, hop tree.

8. For birds.—Russian mulberry, black cherry, Downing mulberry.

9. For nut trees.—Chestnut, walnut, hickory, pecan, beech, chinquapin, burr oak, butternut.

“How interesting it is to watch the plant industries as they are carried on side by side, each doing its own work wisely and well, and without exciting in the least the envy of its neighbor, and without contention or strife. We see the maple collecting saccharine juices,

the pine resin, the poppy, opium, the oak, tannin, and so on through the list. In our gardens the aconite collects a deadly poison which it stores up in its tubers, and by its side the potato gathers in starch for the sustenance of man. The plant's adaption to the soil and climate in which it is to grow is one of the most beautiful and useful studies for the old as well as the young.

"As the leaves of the trees are said to absorb all noxious qualities of the air, and to breathe forth a purer atmosphere, so it seems to me as if they draw from us all sordid and angry passions and breathe forth peace and philanthropy."

The trees may outlive the memory of more than one of those in whose honor they are planted. I have written many verses, but the best poems I have produced are the trees I have planted on the hill side. Nature finds rhymes for them in the recurring measures of the seasons, says Oliver Wendell Holmes.

In conclusion many a man would find a most healthful and delightful recreation if he will but give some of his spare time from his office or his business, to the planting of some ornamental or fruit trees and to the care of them. He would lose every thought of business care, and would enjoy the most complete rest and relief that any occupation could possibly bring him, add years to his life and take wrinkles from his brow. Love trees, protect trees, care for them plant them, water them, train them, feed them, talk with them, and you may be sure they will repay you a thousand fold.

THURSDAY, December 5, 9 a. m.

Invocation by Rev. S. B. Campbell.

Reports of Local Societies.

REPORT OF RANDOLPH COUNTY HORTICULTURAL SOCIETY.

The past year has been fraught with many drawbacks and disappointments and few successes to the fruit grower of this locality. However, we have not lost courage, but will profit by the lessons of the past season.

We were very much elated with the prospect in early spring. Such a profusion of bloom has seldom been seen. Every one said, "We are sure to have a fruit crop this year that will be a record-breaker," but all our bright hopes were dashed to the ground in disappointment. Still nothing is so bad but that it might be worse.

The apple crop in this section was practically a failure; what few remained on the trees were very inferior. The peach crop was very good, being cut though on account of extreme drouth in quality.

Pears did very well considering the season, quality being very good, especially Keifer and Duchess.

Strawberries were badly effected by the drouth, but prices were good for home grown berries, being from \$1.25 to \$2.50 per crate.

Blackberries were almost a total failure as the fruit dried on the vines before maturing.

Reports from fruit growers of the county are to the effect that the trees are in better condition than they have been since they bore the big crop in '97, and that the outlook is good for a full crop in 1902, especially with apples. However, peaches that bore a full crop the past season have set very little fruit.

This Society was pained to learn of the death of Bros. Miller and Nelson, two of the most valuable members of the State Society. Two of the brightest lights have passed from us and we extend our heartfelt sympathy to the bereaved families in this their hour of trial.

We trust that the meeting at St. Joseph will be a profitable one and that much good will be derived from it, and when I say that we would welcome you back to Moberly again I only voice the sentiments of every fruit grower of this county.

C. W. HALLIBURTON,
Secretary Randolph County Horticultural Society.

WRIGHT COUNTY.

Mountain Grove Horticultural Society holds regular monthly meetings. Has had 30 new members the past year.

Our people have a fruit union and shipped peaches in carload lots for first time the past season. Those who went into the association are very well satisfied with the results, and carload shipments will be the rule hereafter.

Strawberries were only 25 per cent. of a crop. Kansas raspberries and Early Harvest blackberries gave few pickings only; peaches and apples were good crops and apples especially brought good prices. The size of both peaches and apples was cut down by extreme drouth, but the fruit was highly colored and made a handsome package.

Largest crop of both fruits ever known in our vicinity, and was about the only crop grown.

MRS. A. Z. MOORE, Sec'y.

ANOTHER WORD FOR THOROUGH CULTURE.

Barring, Knox County, November 22nd, 1901.

Hon. L. A. Goodman:

My Dear Sir—Your notice and program for the meeting of the State Horticultural Society received. Thanks. I am sorry that I am not able to attend, but will be with you in spirit, and the best wishes for a pleasant and cheerful meeting. I was pained recently to read of the death of Treasurer A. Nelson; he has gone to his reward. He will live in the history of coming generations as a man worthy of imitation by all good men, especially of the horticultural profession.

This has been an unfavorable year for horticulture, and agriculture as well. This season puts me in memory of the year of 1854, which was similar in regard to drouth and extreme heat and very short crops. We had about a half crop of strawberries; other kinds of berries mostly dried up on the bushes, except gooseberries and currants. We had a fair crop of cherries and about a half crop of plums and peaches.

Grapes, where properly cultivated, were a good crop without rot or mildew, but the young wood on many vines remained green until frost, so there will not be the usual amount of ripe bearing wood for the next crop. This season has fully convinced me of the utility of cultivating trees and vines of all kinds. I have about thirty pear trees in my garden, mostly of bearing age, which I cultivated with hoe and rake, keeping a dust mulch several inches deep around them, which perfected a fine crop of pears, while I have a row of Kiefer trees at the west end of our door yard, around which I spaded a space about eight feet square, but gave them no more attention. This row looked hard, the leaves dropped during the hot spell and I was afraid they would perish, but they managed to live, but the pears did not get much bigger than crab apples. Those trees in the garden never flinched during the hot spell. Several observing visitors were struck with the difference between the two lots of trees, and remarked that it was a lesson worthy to be remembered. I have come to the conclusion that it would be best for all intending to plant an orchard to never plant more trees than they could or would take the best care of. It has often pained me that within the point of my observation orchards are so badly neglected, the old orchards are going down hill at a rapid rate, and the young orchards are sadly neglected. I know of very few that get half proper attention. To sum it all up in a nutshell, there is room for some specialist to plant orchards

here in the county of Knox and make a success, as trees properly cared for do well here, as there are trees within my knowledge that are over thirty-five to forty years old that are still alive and bear some fruit occasionally, which would seem to indicate that if good trees are planted and properly cared for that fruit growing would be as profitable right here as anywhere else. The apple crop is rather a short crop this season and they are not keeping well; it is perhaps fortunate for the trees that they had a light crop on account of the great drouth and hot spell, which had they had a heavy crop of fruit, would have caused the death of many trees. They have gone into winter quarters in good condition.

With best wishes for a good meeting, and for a more prosperous season next year, I am yours truly,

PETER DAILING.

Mr. Robnett, Columbia, Mo.—Boone County Society is inactive in the way of a society, but we have some very active men in our county, and we meet on the streets and in the stores and we talk in regard to horticulture; and this year's crop, while it has not been what we would like to have had, in the number of barrels, the price has been good and brought us more money than we ever got any year in our county, and I believe that there has been more carloads of apples shipped from our county than ever were shipped out before. We can sell good apples for \$5 a barrel in Columbia. I sold some Jonathans for \$5 a barrel; had them in cold storage. There is going to be a demand for apple trees in our county next spring that has never been there before, and while I say we don't meet regularly in our society, we still have a society and the members meet and talk here and there, and I think if we should have a good season and a good crop at the same time that we would come together and meet and do better.

Mr. Wilson of Buchanan County.—Our organization in this county is in better shape than it has been for years. We meet regularly and have a fair attendance. As to crops in this county. There was some fine crops and there were some total failures. In regard to apples. My friend over there, Mr. Maxwell, who read his paper yesterday, had fine success, and some others had total failures. The strawberry crop was cut short by dry weather, and blackberries and raspberries were almost a total failure on account of the dry weather.

Mr. Hopkins of Springfield, Mo.—The Greene County Horticultural Society is in fine shape. I went down there from Kansas City 15 years ago, and the very next week I became a member of that society, and from that day to this that society has never failed to meet upon its regular day of meeting the first Saturday in each month. We are taking in new

members all the time and some members are dropping out, but there seems to be an interest all the time, and one thing that I believe that induces so many to come, we keep up our regular picnic dinners the year around. Perhaps there is no other society in the State of Missouri that does that. In the winter months we meet in a hall and pay for it, and have our regular dinners and it is no trouble to get them to come in. In the summer we got out to the houses on the invitation of the fruit growers. I went from a live society—I started in a live society, the Old Missouri Valley—and I am glad that I got into one that has come up pretty close to it, if not at present in the lead.

So far as the fruit prospects and the fruit crop that we have had, we have no reason to complain particularly. While we have had a very severe drouth our strawberry crop was about the best we have had in a number of years, and we got pretty good prices, as compared with the prices in former years. We had a good peach crop. I never saw finer peaches in my life and the prices were good. We have had a good apple crop and got good prices. While the strawberry prospects are not the most flattering we will still have some strawberries. Those that have been properly cultivated and taken care of, and will be properly mulched through the winter will have some berries yet. My plants that are left are looking well, and I had a good stand from the young setting of last spring. While they didn't make so many runners, I think they will make a fine crop, and I think they will be fine berries.

Mr. Gano, Platte County.—We have no big tales to tell about our crops of fruit. The only thing we work for and look to is the next year's prospects. I believe that our society is the parent, not only of the Missouri State Society, but the Kansas State Society.

Mr. Evans.—I desire to report not for a society, not for a county, but I want to make a report for the southern slope of the Ozark mountains, not that I live there either, but I am there some. The rain ceased and the drouth set in the 17th day of April and you cannot expect much of a crop in an average kind of a country, where it had not rained a drop since that; not enough to lay the dust. The strawberry crop was more than a half crop; all other fruits were cut almost entirely off. The best peaches we found in any of the orchards were where the ground was completely covered with stone, and in that case there was no surface soil, but the red land comes up to the rocks; the rocks lie right on the surface. The roots of these peach trees penetrate that red land, which never gets dry, and the finest specimens of peaches grew on the rockiest land in that whole country. The best corn grown in that whole country, and it was not much corn—nubbins—grew on those rocky points. The fruit

crop has been sold and I expect there are not enough apples in there for the children this winter in that whole section. Buyers came in there and paid enormous prices any way they could get apples—in the barrel, in the wagon, on the trees or any other way, and they paid big prices for them; peaches the same way. They bought all the peaches and took them off. We have not had to consign anything from that country through any commission men; the people are happy; they have got plenty of money.

Prof. Smith of Chillicothe.—I wish to make a short verbal report. I think we live exactly in the center of the drouth district. Our corn will average on the uplands from five to ten bushels an acre, and in other places won't make that.

As to fruit, we have in Livingston county some very good orchards; most of the orchards are family orchards. We have a few orchards of from forty up to two hundred acres, but there are but a few orchards in the county that will run over ten acres; and yet we have, in ordinary years, a good deal of fruit there. In that section trees that were over ten years of age had absolutely no apples on them, in almost every instance, and on the prairie land I didn't see a barrel of apples. The best crop that we had there that I know anything about was about one-third of a crop on the young trees. Those apples, when they ought to have been half to two-thirds grown, were about one-fourth grown. The drouth was finally broken by a little shower of rain, possibly two or three showers after the corn was ruined, and the apples started to grow and they split open in all manner of shapes, and when we came to barrel the apples from those young trees, about twenty-five per cent. of them went to culls. In other places fifty per cent. went to culls, and I picked some off of my orchard of eight-year-old trees this year that went eighty per cent to culls; about the other twenty per cent. of them were number two. If I had picked them ten days earlier, possibly I would have gotten fifty per cent. number twos and possibly a little more than that. This is an apple, however, that you say nothing about here. That is the Willow Twig. It keeps badly, but it has made us more money throughout that section than any other apple, barring the Ben Davis, and this year had twice the amount of apples grown than the Ben Davis.

Now, as to the peaches. We had some very good specimens. We had some as fine as I saw that came from the southern slopes of the Ozarks. We didn't have a very great many, for we have not so many trees through that section. And the strawberries, we raised a good many and got a good price until the drouth cut them short. We had a quarter of a crop of strawberries, and will possibly have a fourth of a crop next year, if we have a good season. Raspberries don't do well in our country. However, Mr. R. T. Smith, and he is not a relative of mine,

by the way, who lives at Utica, raises some very fine raspberries, and he says that he makes more on raspberries than anything else. As to our Horticultural Society, we have usually about 12 to 15 at our meetings, but the same ones on an average. We think the fruit prospects for Livingston county are good.

Mr. Atwood, Springfield, Mo.—It seems to me it is proper to say that we have about 30 societies west of Springfield on the 'Frisco line, co-operative, and they are all in fine shape, with a few exceptions. Our strawberry season last year was the finest we ever had; not the largest crop, but we made more money. Our growers made more money last season than ever before. The average was at least \$1.40 on track, and most of the berries were sold on track. We shipped at least two hundred carloads.

Mr. Butler.—I believe I am the only representative from DeKalb county. I report very favorably for our county. A few orchards bore perhaps one-half to two-thirds of a crop of apples. My orchard seemed to be one of the poor ones. I packed a few of my apples that I thought good enough for cold storage for later use. I found the home market good for the rest that I had, and the most of my fruit I sold to farmers that ought to have grown their own fruit. DeKalb county is behind in this line. We can grow our own fruit, but the trouble is to make the people believe it.

There are not many strawberries grown in our county, not because they are not a success, but because they don't take much interest in them. I had about a half of a crop, but they brought me as much as a whole crop would ordinarily. Raspberries and blackberries, I didn't need an evaporator, for they dried on the vines. I don't know what this meeting says about gooseberries, but with me they proved a failure; currants also.

As to a society, I wish we had one so we could interest our people in horticulture. I have enjoyed this meeting very much. I take the liberty of mentioning that as I go away today.

Mr. McNallie of Sarcoxie, Jasper County.—I will start out with our small fruit. Some people had good crops of strawberries, while others had nearly a failure, and not being more than two or three miles apart. The blackberries and gooseberries and raspberries were nearly a total failure.

The apple and peach crops were good. The best, I expect, on an average that there has been for years. The apples were not as large as in some of the orchards, but there was a heavy crop, and they were more perfect this year than they have been for a great many years. The insects seemed to die; I think that they died on account of the drouth or some other cause.

We have a very lively society there at our place. Most of the members here have taken credit for meeting once a month; we generally meet two or three times every month, and we have a very lively time, and I don't know that it is of any great benefit to our society. It is largely in quarreling. I believe when I go back home I will advise that we have something to eat for our society. I would judge from the reports of these other gentlemen that it keeps them in good humor; I think we need a change of some kind; I don't know what it is.

Mr. Nelson, Laclede County.—Laclede county doesn't grow anything but apples and peaches. We packed about twenty-five thousand barrels in our county. Our peach crop was very fine. We organized a local society two weeks ago and we expect to work from now on.

Mr. Schnell of Howard County.—I am sorry to say we have no horticultural society. While I don't want to say we were in the center of the drouth district, I believe we had a little special district. We had practically no rains during the summer. We had a little better than a half crop of strawberries; comparing it with 1897 we had about one-sixth of a crop. In places the apples were good, but the Canker Worm is getting a firm hold in Howard county, and the people have done very little there.

The peach crop was excellent. We had fine peaches and got good prices for them. They were sold at home and the nearby towns.

Raspberries we got a few pickings at the start, and the latter part of the crop all dried up. Blackberries were well cultivated, but outside of the Early Harvest we didn't get anything. The Early Harvest furnished a fair picking, and the prospect for strawberries for another year is doubtful. With the very best of weather we can't expect over one-fourth of a crop. There are few plants; the plants made a very few runners.

Mr. Butterfield of St. Francois County.—We have a local society there. We had a fair crop of strawberries and sold them at good prices, and got from \$1.50 to \$2 a crate, and we had a partial crop of raspberries and some blackberries. We had a full crop of grapes. We realized from four to five cents a pound for our grapes, and they averaged about ten pounds to the vine—on two-year-old vines. We had a good peach crop, but, of course, nearly all through that section they are growing the seedlings altogether. Apples, I am sorry to say, that nearly all of the orchards are ruined by the Canker Worm. Our crop was a failure. You can see some samples there on the table; of course, I brought the best. I supposed that we were in the center of the great drouth district, but I don't know whether we were or not. We had a rain on the 17th day of April,

and we had a quarter of an inch of rain on the 4th of July, and a quarter on the fifth, and we had no more rain then until the 15th of September.

Mr. Speakman of Neosho, Mo.—We have no county society. We have an association for the shipment of small fruits, which I think is in very fair working order. The past season was fairly good for small fruits. That is, for the strawberries; the strawberries with us brought an average yield and the quality was surely better for the most part than the ordinary season. The apple crop for the most part was quite good. Some orchards that were cultivated properly, and I don't know that any of them were cultivated properly, but those that received the best treatment, and the most cultivation, the most spraying and attention generally yielded very good crops of good fruit, while the others as compared with them, were failures.

The peach crop was something immense. The biggest crop that was ever known there. Now as to prospects I will say that we have had more rain evidently than many of these localities from which reports come, and our trees are in good condition; much better than the average after a severe drouth, and we have prospects for more than a half a crop of fruit from our strawberries.

Mr. Dix of Jefferson City, Mo.—In our county we had a good crop of strawberries, and the other berries were a light crop. Where it was cultivated we had a fine crop of tree fruit, and those that didn't cultivate had hardly any.

President Murray, Holt County.—We have no local society in existence now, but we are still raising fruit. There was no general crop of apples. I will state in regard to strawberries they were good, but there is no large quantity grown; there are no large growers in Holt county. There are some small growers and they find a ready market for what they grow at home.

As for the blackberries and raspberries, they were a half crop. I netted \$200 from my blackberry patch, which was about a half crop. The peaches were exceptionally fine, although we don't have large peach orchards. We have some fine peach orchards, and the fruit sold readily and at good prices bringing in from one to two hundred dollars an acre net money. The apples were a failure to a large extent, although there were some orchards that had a good many apples. The apples sold from about \$25 to \$200 an acre. The trees that are over six years old are in fine condition. We did not suffer as much from the drouth as we did from the extreme heat, although we had a drouth. I think the prospects for another year, generally speaking, are good, and the fruit growers are of good heart, and we now feel more like taking an interest in cultivating and caring for the orchards, I think, than we have

for the last ten years. Now we have delegates visiting us from other states that we would like to hear from, and what the condition of things is.

Mr. Barnes, Secretary Kansas State Horticultural Society.—Kansas has had an extraordinary fruit year, and I congratulate Missouri because it lays so close to Kansas this year. Our strawberries in the south part of the state were excellent and a very profitable crop. In the north part of the state they started in all right, and wound off rather poor. The plants set last spring, some of them were killed, but the plants that did live through are excellent. The patches are all green and thrifty and ready for a crop next year, with the exception of where some of them were killed.

Our blackberries and raspberries were almost a total failure. The pear crop has been fair. We never had as many peaches in the State before as we had this year, and the growers got good prices. A number of our new peach orchards were overloaded..

There were apples everywhere where apples were planted in our state. In fact we never had such reports from apples before since the orchards were planted, and in places where we didn't know that there were any orchards, we found large orchards. In fact the buyers were surprised. They came in with a rush to buy from the old orchards, whose names they had on their books, and they found out that there were a lot of new orchards. Our trouble has been in getting rid of the crop.

In Wabaunsee county and down through there they didn't anticipate such a crop. Our apples during the drouth, as here in Missouri, were very small; when the rain came they were not to exceed three-quarters of an inch—the winter apples—and after the rains came we were surprised at the development. They seemed to be freer from insects and diseases than usual, and they grew so rapidly that we were surprised. We were overtaken with a shortage of barrels and a shortage of facilities to take care of them. I do not say that individuals have not grown more apples, for Judge Wellhouse has grown more apples in years before than he did this year, but the state taken as a whole and the young trees that came into bearing for the first or second time—the first good crop—they have succeeded better than ever before, and the prices have been exceedingly good in near to the cities. We find that out in the counties where there were no men there buying the apples that the prices were not what they ought to have been in those cases. Advantage may have been taken of them in buying their crop as a whole or in buying them in a certain condition.

I would like to add, though, that our people are enthusiastic and are still planting trees. The nursery men know more about that than I

do. They will tell you that the Kansas people do plant trees and plant a great many of them, and to show you that the enthusiasm never stops, President Wellhouse, who is older probably than any other man in the house, with one or two exceptions, is still planting orchards. He is now negotiating for another tract of land to plant another orchard on. We can plant trees no matter what our age is; if we don't get the good of them somebody else will.

I was up at Tonganoxie to an orchard he planted seven years ago and the trees were just one mass of Gano apples of fine quality. They were packing them in barrels at that time.

I want to say that the Kansas State Horticultural Society will hold their meeting the day following Christmas, the 26th, 27th and 28th of December, and you are all invited to be present. If you want to see another display of good fruit come over to the state house at Topeka and stay with us during the three days.

Mr. Augustine of Illinois.—I am certainly pleased to be with you, and I am very much pleased with the enthusiasm and interest that your society is manifesting. I am really surprised to find such a large attendance. I have been in the habit of attending one society and one sister state society every year, but for some reason or other I never got down into Missouri, but I find that your attendance is larger, I believe, than almost any other state that I have visited, unless it may be Michigan, and Iowa will come pretty close to it. I have to say Iowa, because friend Wilson is right by my side here. I have been very much pleased with my visit here.

So far as the fruit interests of my own state are concerned, I am free to say we have not been so enthusiastic this year. We have had a moderate crop of apples; not by any means a full crop; not more than a half of a crop in the apple regions, and I am sorry to say that we have been troubled with the Codling Moth worse than perhaps any year in many years past. In fact, I never knew it to be so bad. Some very fine appearing apples were just completely riddled, and were almost unfit for the market, because of the damage done by the Codling Moth.

We are having a growing interest in our state in the way of the Kieffer pear. Our people are planting very largely, and we are having annual crops. The pears sell very well, and they are coming into bearing, and our people are very enthusiastic over the Kieffer, and I might say they are planting the Garber along with it, and they are coming along to plant the Leconte also, but the Kieffer is the one most favored with us, and it is more regular in its bearing than most any other fruit. This is more particularly so, because we can't grow the common varieties in our state.

So far as the small fruits were concerned we had a very light crop of blackberries and raspberries. The small fruits seemed to suffer more from the drouth than our field crops did.

Our corn and oat crop was very good; and yet in that land a little loose, the berries will very often suffer when the other crops don't. They can't stand the drouth. Our strawberry prospects for the coming year are nothing to boast of at all. In fact, in some places they are almost worthless. I have seen acres of them that have not made any new plants whatever, and the plants from last spring are not in real good shape; they didn't start well and they have not made many runners and the old beds, I think, unless they come out wonderfully in the spring, as they sometimes do (but which we don't expect), are a failure.

On the whole, we are quite enthusiastic yet. We think Illinois is still along in the ranks of the fruit growing states, especially the apple interests from the south half of our state.

We meet next week, and I want to say the same as my Kansas friend, we would like to see you all there. We have a new agricultural building now at Champagne, and I expect it is the largest known in the world, and perhaps the finest; it covers three acres of ground, and I think we could accommodate all of you, and my friends from Kansas, and Bro. Wilson might bring a few of them from Iowa, and we would still have room; I bid you a hearty welcome if you visit us.

Mr. Marshall of Nebraska, President State Horticultural Society of Nebraska.—Mr. Chairman: We have a delegate here in Mr. Emerson, and I wish to say for fear I forget it, that I want you to appoint a delegate to the Nebraska meeting. The other brothers gave their invitation last, and I am going to give mine first. Our meeting will be in Lincoln. The annual meeting is always in Lincoln. It will be the 14th, 15th and 16th of January, and we promise you a good time and an interesting time, if you will come over during those three days.

Now in taking up the past year's work, I will say that the drouth cut our strawberry plants down considerably. We don't have large plantations there like you do in parts of your state here, but we have some men there who are growing quite extensively since there is a good home market. They are not run as they should be and the result is there are gaps in the rows, and we cannot expect more than a half of a crop next year. The plants are in good shape and we look for a good quality of fruit. The raspberries and blackberries bore a poor crop, hardly a third of a crop. Blackberries would have been a good crop with us if it had not been for the drouth. The drouth cut them down. The cherries were a moderate crop of very good fruit. The cherry is something that grows all over our state; they grow way up in the sand hills in the western

part of our state. It is the first fruit they plant. The plums were a good crop and of good quality. The peaches were good. You understand that we don't grow a great many peaches there, only in the south half of the state, but they have a few scattered all over the state, and wherever there were trees they were full of fruit.

The apples, I judge, were about a half crop, and the quality was good, especially the quality of the late fall and winter apples. We had the same experience that I have heard related here during the drouth in the summer and that extreme hot weather, and we thought we would not have any apples. Winter apples were not an inch in diameter; little bit of things, but when we had a rain they began to grow and they grew and colored up, and they seem to be free from all diseases, and are in good shape, except Codling Moth. We have some Codling Moth—I believe a little more than you have here.

Now, in going back to our meeting, I extend you all a hearty welcome to come over there and we hope that some of you will come. We live a good ways west and there are some of us that are wild and woolly, but no difference. If you will come and labor with us as missionaries it will do us good, and if we can be of any service to you, will be glad to do it.

Mr. Wilson of Iowa.—Mr. President and Gentlemen of the Society: It affords me a great deal of pleasure to be present at your meeting. This is the first meeting I have had the pleasure of attending of the Missouri State Horticultural Society. Of course, I have known for a good many years that you have a good many live fruit men in this region, but I am surprised to see the large attendance and the interest manifested. I think as my friend Captain Augustine said, it is the largest attendance of any State Society that I have attended for a number of years. Of course, you have a great deal here to interest your people. You have been a little more fortunate in being blessed with a better climate than we are further north, and you have some advantages in growing fruit that we do not have. We have got to "hustle" more, as we call it over in Iowa, to grow fruit than you have here in Missouri. The question of varieties suitable to our climate has been a great problem with us, but I am glad to say that we have been making great strides in that direction. We have enthusiastic people along those lines, and they have been liberally treated by the legislature in the way of appropriating moneys to carry on our work. We have not failed to get all the money that we have asked for, and could use economically along those lines, and we are not afraid of the future, and we have a number of experimental stations that have developed a great many new valuable fruits.

Our people are very enthusiastic over the plum, the native Ameri-

can plum, and we have a number of what we call plum cranks in Iowa and they are a pretty good thing to have. They are a very useful class of men. Whenever you find a plum crank or cherry crank or apple crank or grape crank or any other kind of fruit cranks, they are the best kind of cranks I know of.

In regard to the apple crop in Iowa it has not been really a full crop. Early summer and fall apples were a fair crop of very good quality, but winter apples are rather a short crop, perhaps from thirty to fifty per cent. Some very good orchards where men have sprayed their orchards and given them good care. It goes to show that we can't get something for nothing in the fruit business. We have got to hustle and we have got to work for all the good fruits we get. A few days ago a gentleman from Oregon, who used to live in Iowa, called on me and paid me a little visit, and he is in the apple region in Northeastern Oregon at an elevation of five thousand feet above sea level, and I asked him about his fruit crop and he said that it was really a good apple country, and when he told me what altitude they were growing apples in, of course, I could agree with him, and he said that they could not grow apples at all, if they didn't spray—the Codling Moth was so numerous that they had to fight for every apple they got, but they got good apples notwithstanding the attacks of these insects.

Now we have come to a stage of fruit growing in this country that we have to give our trees careful attention. We have got to spray. I am a great believer in spraying, because I have seen good results from careful men who have practiced it; that is certainly substantial evidence to us all when men have gone into it scientifically and persistently and have succeeded; that is evidence that there is something in spraying.

We can destroy insects to a great extent and we can preserve our fruits by spraying. Now, over in Iowa, we grow cherries to a very high degree of perfection. I am glad to hear our friend, Mr. Marshall, from Nebraska, claim that they grow cherries all over the state. I guess that is true. Nebraska is a good cherry state, but I don't believe it is any ahead of Iowa. We grow great crops of cherries in Iowa. This year we had a magnificent crop. But three years ago this winter (it will be three years in February) when we had such excessive cold, and combination of very peculiar climatic conditions, it destroyed many of our cherry trees and plum trees and almost wiped the peach orchards out, and fully eighty per cent. of the vineyards were destroyed and only a small locality left where any were raised to any considerable extent. But the peach crop this year was a good one wherever there were trees, even up to the center of Iowa and north of the center up as far as Boone county there were fine specimens of peaches grown and exhibited

at our state fair. We had good peaches wherever there were trees, and there were quite a number of the trees that did pull through the hard winter of two or three years ago. Our people are very enthusiastic in planting peaches and cherries, and now they are beginning to replant their vineyards; they are beginning to realize the fact that we can't depend upon New York grapes when we can produce them at home just as cheaply as they can in New York and just as good quality, and our people are keeping pace with the adjoining states on all these lines, and we are quite enthusiastic, although we are not so favorably located as you are in Missouri and Kansas in regard to climate.

Our State Horticultural Society convenes in Des Moines on next Tuesday and I wish to extend a cordial invitation and an urgent invitation to you all to come up and join us and help us out. We will try to make you feel at home. We will treat you kindly, and we will give you a chance to be questioned, as you have questioned me here, and we will put some hard questions to you doubtless, and we would be glad to have you come up there and help us out, and answer those questions.

President Murray.—Now ladies and gentlemen, we have a gentleman present here who was sent to Europe to look over their fruits from a scientific standpoint. I am going to call on him, too. I wish to call on Prof. Von Schrenk, who has just returned from Europe, and he will tell us briefly what he saw of the fruits of Europe and their prospects.

Prof. H. von Schrenk.—One thing that I was impressed with most, in going around through the various European countries, was the universal saying, whenever I spoke of fruits or anything of that sort, "We understand that you have apples and things of that kind on your table once every day, how is that?" It always provoked a sort of smile when I came to look around and saw that apples and fruits of that character to them were rather considered a great luxury. I wanted to buy a pineapple in one of the larger cities, and I could not find one, until I finally found one in a florist's shop. That ought to be a good deal of encouragement, and more cannot be said to the apple growers and fruit growers of this country, than that is a field that has been practically untouched as yet.

I didn't have much time to look into the question of apples particularly, but what time I did have, I went around through the markets of London and Berlin and St. Petersburg, and the very largest cities of Europe, and I was surprised at the general absence of fruits of the character, which we know in our small towns. The only place where I did find a great many apples, strange to say, was in St. Petersburg. The Russians are very fond of apples; they grow a great many of them, and they bring them down in vast boat loads—down their rivers, and dump

them out on their wharves in great piles, seven or eight feet high. In Moscow they had a pile seven or eight feet high, and they sell them to the peasants for a small copper coin.

In Central Europe the fruit is considered a great deal of a luxury, and when I went around through their farms, a farmer thought he had quite an orchard when he had twelve American trees. You can tell their apples all the time, and the only ones I saw were in Western Europe, they were striking affairs as compared with ours. Those that grow there are generally pale, and they are small and the character of apples I don't think any of us would eat. The chief competitors of the American apple in the English market, are those from New Zealand, and there a great lesson could be learned by apple growers, viz.: How to ship them and to pack them.

I don't think it is the province of the farmer and fruit grower to learn how to ship them and make costly experiments. I think that is the province of those who deal in fruits. I think that is one of the great problems that we can settle in the future, and one thing that ought to be encouraged by those engaged in the growing of fruits. People ought to determine what should be done with these fruits in order to get them into the open market. The apples come from New Zealand, and certainly they ought to come from the United States, which is not half the distance that it is from New Zealand to London, and they should go to Berlin, where they will pay high prices. The mere fact that they have not got them, and that they might be there if we took the opportunity, is a thing that is rather encouraging and I can't put it strong enough. I say I can't put it strong enough the fact that it ought to be encouraged, and ought to echo what Mr. Barnes has said, that nobody ought to be afraid to grow more apples. They may not be able to sell a great many of them here, but the chances seem very, very good to sell them across the water, provided they are good apples. Now if the packing is done, as I have seen it done, without mentioning any names, in several states surrounding this one this fall, it would not raise the reputation of the fruit at all. I was present when a lot of fruit was opened in New York from the Missouri market in the early part of October, and there was about ten barrels of Missouri apples, and every one of those barrels was rejected by prospective buyers on account of the poor quality in the center of the barrel and the good fruit on the top. One man said, that any one that would pack them that way, that he would not have anything to do with, and that is what we have to guard against in shipping them to other countries; and that is a problem that I don't think the fruit farmer is justified in going into, but instead the one that ships a great many apples.

Now the apples I see here remind me of the pleasure I had when I did see an American apple. I have forgotten whether it was a Ben Davis or what it was; anyway a red apple, instead of the pale affair, such as they grow over there. So, let me say again, as I said before, very strongly, that the chances of apple growing in the future in this country are very vast and anybody who has an opportunity to do so ought to go into it head and soul.

Mr. Wilson of Iowa.—Now in regard to the Russian apples, did you taste them over there?

Prof. Von Schrenk.—Yes, sir; I brought a great many of the seeds of those Russian apples with me, particularly on account of the question that was raised by you in respect to Iowa and Dakota. Those apples were acid apples, most of them, and they were apples that were not as large as our Ben Davis or Gano, but they were apples of a very fine flavor; they were of a pale color and like the majority of the Russian apples we know here of a hardier grade, but they were apples that stood the temperature over there, but none of them, of course, were equal in body or flavor to any of these we have here at the present time; but the chances are that if we are careful enough in selecting the right variety, and perhaps grafting with some of them, we may be able to get them to grow through the winter without root rotting.

REPORT OF TREASURER A. NELSON, LEBANON, MO.,
Dec. 3-5, 1901.

Receipts.

June 5, 1901, balance on hand.....	\$506.42
Membership 13, A. Nelson.....	13.00
Membership 20, L. A. Goodman.....	20.00
July 1, Received State Treasurer.....	583.65
Total receipts	<u>\$1,123.07</u>

Disbursements.

June 10, 1901, N. F. Murray, expenses to New Haven	\$12.30
D. A. Robnett, expenses to New Haven...	5.30
Sam'l Miller, expenses to New Haven.....	2.00
L. A. Goodman and assistant, expenses to New Haven	13.50
A. Nelson and assistant, expenses to New Haven	20.10
J. C. Evans, expenses.....	6.50
G. B. Lamm, expenses.....	7.00
Warrant No. 477.....	<u>\$66.70</u>
June 10, Expenses of June meeting:	
Premiums on fruit.....	\$16.00
Hotel bill	17.10
Tablets and pencils.....	1.35
Telegrams .....	.26
Stenographer	15.00
Express bills	1.38
Nelson, expense account.....	4.76
Warrant No. 478.....	<u>\$58.85</u>
June 18, Telegram .....	.32
Express .....	.85
Cornell bulletins	1.00
Hudson & Kimberly, letter-heads, envelopes	23.25
Salary of secretary for June.....	66.66
Salary of typewriter for June.....	20.00
Warrant No. 479	<u>\$112.08</u>
July 29, American Forestry Association.....	\$2.00
100 labels, Scotford .....	.75
Salary of secretary for July.....	66.66
Salary of typewriter for July.....	20.00
P. O. bill.....	12.37
Scotford, postal cards and slips.....	5.75
Warrant No. 480.....	<u>\$107.53</u>

July 29, Expenses of A. Nelson for Buffalo Exposition from July 9, 1900, to Sept. 30, as per bills:

Warrant No. 481.....	\$187.70
Aug. 10, 250 glass jars, part with fruit, for exposition purposes:	

Warrant No. 482.....	\$50.00
Aug. 30, Collecting fruit report.....	\$3.75
Sending out fruit report.....	5.50
W. G. Gano, account.....	10.00
Salary of secretary for August.....	66.66
Salary of typewriter for August.....	20.00

Warrant No. 483.....	\$105.91
Sept. 30, N. F. Murray, expenses to American Pom. Society	\$56.65
Salary of secretary for September.....	66.66
Salary of typewriter for September.....	20.00

Warrant No. 484.....	143.31
Oct. 31, Scotford S. & S. Co., 500 P. O. cards.....	\$6.25
Merchants' Transfer Co., 30 boxes for packing glass jars.....	9.00
Salary of secretary for October.....	66.66
Salary of typewriter for October.....	20.00

Warrant No. 485.....	\$101.91
Nov. 20, Joint railroad agent at St. Joseph.....	\$11.00
P. O. bill.....	27.00
Salary of secretary for November.....	66.66
Salary of typewriter for November.....	20.00

Warrant No. 486.....	\$124.66
Nov. 22, Whithead & Hoag, 1 M. badges.....	\$45.35
Scotford S. & S. Co., 2 M. programs.....	13.50
Scotford S. & S. Co., incidentals.....	5.60

Warrant No. 487.....	64.45
----------------------	-------

Total disbursements	\$1,123.10
---------------------------	------------

Total receipts	\$1,123.07
----------------------	------------

The Committee on Finance beg leave to report that they have carefully examined the Treasurer's report and find the same to be correct. Vouchers accompany the report showing the disbursements of all moneys paid out. We also find certificate of deposit in Missouri Valley Trust Co. bank to the credit of the Missouri State Horticultural Society for \$1,071.20, dated July 17, 1901.

GEO. T. TIPPIN, Chairman,
H. S. WAYMAN,
F. H. SPEAKMAN.

On motion report of Committee on Finance was accepted.

REPORT OF TREASURER M. BUTTERFIELD, TO DECEMBER 31, 1901.

Dec. 7, Expenses at Winter Meeting, Miss C. R. Jackson	\$12.00	
Wm. B. Hoag.....	12.00	
D. A. Robnett.....	9.70	
N. F. Murray.....	6.27	
	<hr/>	
Warrant No. 488.....		\$84.97
Dec. 7, Expenses at St. Joseph, M. Butterfield.....	\$19.00	
A. T. Nelson.....	28.80	
Telegram .....	.40	
Postoffice exchange .....	.63	
Premiums paid.....	117.00	
	<hr/>	
Warrant No. 489.....		165.83
Dec. Expenses at Winter Meeting, J. R. Kirk.....	\$10.00	
L. A. Goodman.....	5.10	
Express, 65c, 37c, \$1.80, \$1.93.....	4.75	
Nails, hammer, tacks, etc.....	4.40	
Postoffice bill.....	26.69	
Prof. J. M. Stedman, trip to Washington, D. C.	85.00	
	<hr/>	
Warrant No. 490.....		135.94
Dec. 30, Postoffice bill.....	\$20.00	
Paid on exchange of typewriter.....	36.00	
Salary of Secretary.....	66.66	
Salary of typewriter.....	20.00	
	<hr/>	
Warrant No. 491.....		142.66
Dec. 30, Expenses M. Butterfield, delegate to Illinois..	\$23.35	
W. G. Gano, delegate to Kansas Society	8.70	
L. A. Goodman, delegate to Kansas Society	6.10	
	<hr/>	
Warrant No. 492.....		38.15
Dec. 31, F. J. Stever, stenographer, reporting and transcribing report of Winter Meeting at St. Joseph, Mo., Dec. 3-5, Warrant No. 493		52.30
	<hr/>	
Total amount		\$619.85

Receipts.

From State Auditor, 12-7.....	\$576.33
-------------------------------	----------

Membership by M. Butterfield.....	46.00	
Membership by L. A. Goodman.....	45.00	
		<hr/>
Disbursements		\$667.33
		619.85
		<hr/>
Balance		\$47.48

The following is a list of the premiums taken on Missouri fruit at the Pan-American Exposition, Buffalo, N. Y.:

- 10 Gold medals.
- 88 Silver and bronze medals.
- 6 Certificates of honorable mention.

Also the Missouri State Horticultural Society was awarded the Wilder medal by the American Pomological Society at its meeting in Buffalo, September 12 to 14, 1901.

It is well for us to state here in answer to so many questions about it, that our late Treasurer A. Nelson of Lebanon, Mo., after his appointment by Gov. Stephens as Horticultural Commissioner for Missouri, collected and put in cold storage in St. Louis one hundred and forty barrels of apples to be used for this display. After C. C. Bell was appointed by Gov. Dockery, the Commission bought of Mr. Nelson these apples for use, and did use them during the summer, on the table, making a fine showing. To Mr. Nelson's untiring energy is due the fact that our State was so well represented in the apple show.

Added to this was the collection of apples made by the Society, and held in cold storage by Armour Packing Co., at Kansas City. These apples were repacked and all re-wrapped in July, making twenty-eight barrels of the finest apples that could be found, and shipped to Mr. Bell at Buffalo for the Commission. These apples were some of the best collected over the State from our different members, and to them with the above is due the credit of many of the awards, as has always been the case in all our exhibits. In justice to our late Treasurer and to our public spirited fruit growers and the inquiry of our members, I make this statement.

L. A. GOODMAN,
Secretary Missouri Horticultural Society.

DIPLOMAS OF HONORABLE MENTION.

- II. W. Cook, Potosi, collection of apples.
Peter Goerig, Boonville, display of grapes.
Ed Kemper & Co., Hermann, collection of grapes.
J. G. Lawhorn, Boonville, display of apples.
R. K. Thompson, Beaman, display of Keiffer pears.
J. E. Breit, Savannah, collection of peaches.
J. D. Kaufman, Worth county, display of early Richmond.
Mrs. John Watson, Grant City, 2 jars gooseberries.

BRONZE MEDALS.

- C. Aul & Co., Smithville, display of apples.
J. S. Atwood, Carrollton, display of apples.
R. E. Bailey, Fulton, display of apples.
Bates county, Mo., display of apples.
C. C. Bell, Boonville, display of Lady apples.
M. F. Berry, Hallsville, display of apples.
Boone county, Mo., display of apples.
M. Butterfield, Farmington, display of apples.
Buchanan county, Mo., display of apples.
Callaway county, Mo., display of apples.
Carroll county, Mo., display of apples.
Clay county, Mo., display of apples.
Cooper county, Mo., display of apples.
C. C. Crane, Aurora Springs, sample Huntsman Favorite.
Crawford county, Mo., display of apples.
W. C. Crouch, Carrollton, display of apples.
DeKalb county, Mo., display of apples.
Dent county, Mo., display of apples.
L. V. Dix, Jefferson City, display of apples.
L. B. Durnell, Monett, collection of strawberries.
J. C. Evans, Olden, display of apples.
J. G. Eubanks, Monett, display of strawberries.
W. T. Flournoy, Marionville, display of strawberries.
Franklin county, Mo., display of strawberries.
J. P. Ferguson, Monett, display of strawberries.
W. G. Gano, Parkville, display of apples.
W. G. Ghormley, Greenwood, display of apples.
A. H. Gilkeson, Warrensburg, display of apples.

C. M. Gordon, California, display of apples.
Greene county, Mo., display of apples.
J. L. Hamlin, Monett, display of strawberries.
Conrad Hartzell, St. Joseph, display of apples.
Holt county, Mo., display of apples.
Howell county, Mo., display of apples.
Wm. F. Hoy, Farmington, display of apples.
D. M. Hulen, Hallsville, display of apples.
Jackson county, Mo., display of apples.
W. H. Jenkins, Boonville, display of fruits.
Johnson county, Mo., display of apples.
E. J. Jones, Hazel Run, display of apples.
Laclede county, Mo., display of apples.
Lawrence county, Mo., display of apples.
Leake Bros., Orrick, display of apples.
S. H. Leatke, Mine LaMotte, display of apples.
Livingston county, Mo., display of apples.
Madison county, Mo., display of apples.
J. H. Marion, Fulton, display of apples.
E. W. McCoy, Utica, display of apples.
McDonald county, Mo., display of apples.
F. M. Merritt, Pilot Grove, display of apples.
Miller county, Mo., display of apples.
Sam'l Miller, Bluffton, display of apples.
N. F. Murray & Sons, Oregon, display of apples.
W. K. Nicholson, St. Louis, display of apples.
A. Nelson, Lebanon, display of apples.
Ira Neff, Marionville, display of apples.
Newton county, Mo., display of apples.
Ozark Orchard Co., Goodman, display of apples.
Perry county, Mo., display of apples.
Platte county, Mo., display of apples.
Pulaski county, Mo., display of apples.
Geo. Raup, Monett, display of strawberries.
J. R. Russell, Monett, display of strawberries.
J. T. Snodgrass, West Plains, display of apples.
P. O. Snyder, Monett, display of strawberries.
F. H. Speakman, Neosho, display of apples.
St. Francois county, Mo., display of apples.
J. T. Stinson, Mt. Grove, display of apples.
Stone Hill Wine Co., Herman, display of grapes.

- G. T. Tippin, Springfield, display of strawberries.
 G. T. Tippin, Springfield, display of apples.
 Tippin & Moore, Mt. Grove, display of apples.
 Washington county, Mo., display of apples.
 Wayne county, Mo., display of apples.
 H. J. Weber & Sons, Nursery, preserved strawberries.
 Stone Hill Wine Co., Herman, wine (grape) vinegar.
 Webster county, Mo., display of apples.
 J. C. Whitten, Columbia, display of apples.
 C. H. Williamson, Skidmore, display of apples.
 J. F. Wilson, Monett, display of strawberries.
 L. S. Witmer, Seymour, display of apples.
 Wright county, Mo., display of apples.
 C. J. Zeiting & Bro., Zeitonia, display of apples.

A list of the Awards of Missouri Horticultural Exhibit taken at the Pan-American Exposition. The total awards so far as reported are 104, consisting of TEN GOLD MEDALS, viz.:

One to Missouri State Horticultural Society for display of apples.

One to Missouri State Agriculture College, general display of apples.

One to Monett Horticultural Society, for general display of strawberries.

One to Olden Fruit Co., Olden, Mo., for display of apples.

One to McNair Orchard Co., St. Elmo, Mo., for display of peaches.

And five to the State of Missouri for various entries on apples and fruits, etc.

Also FIVE SILVER MEDALS:

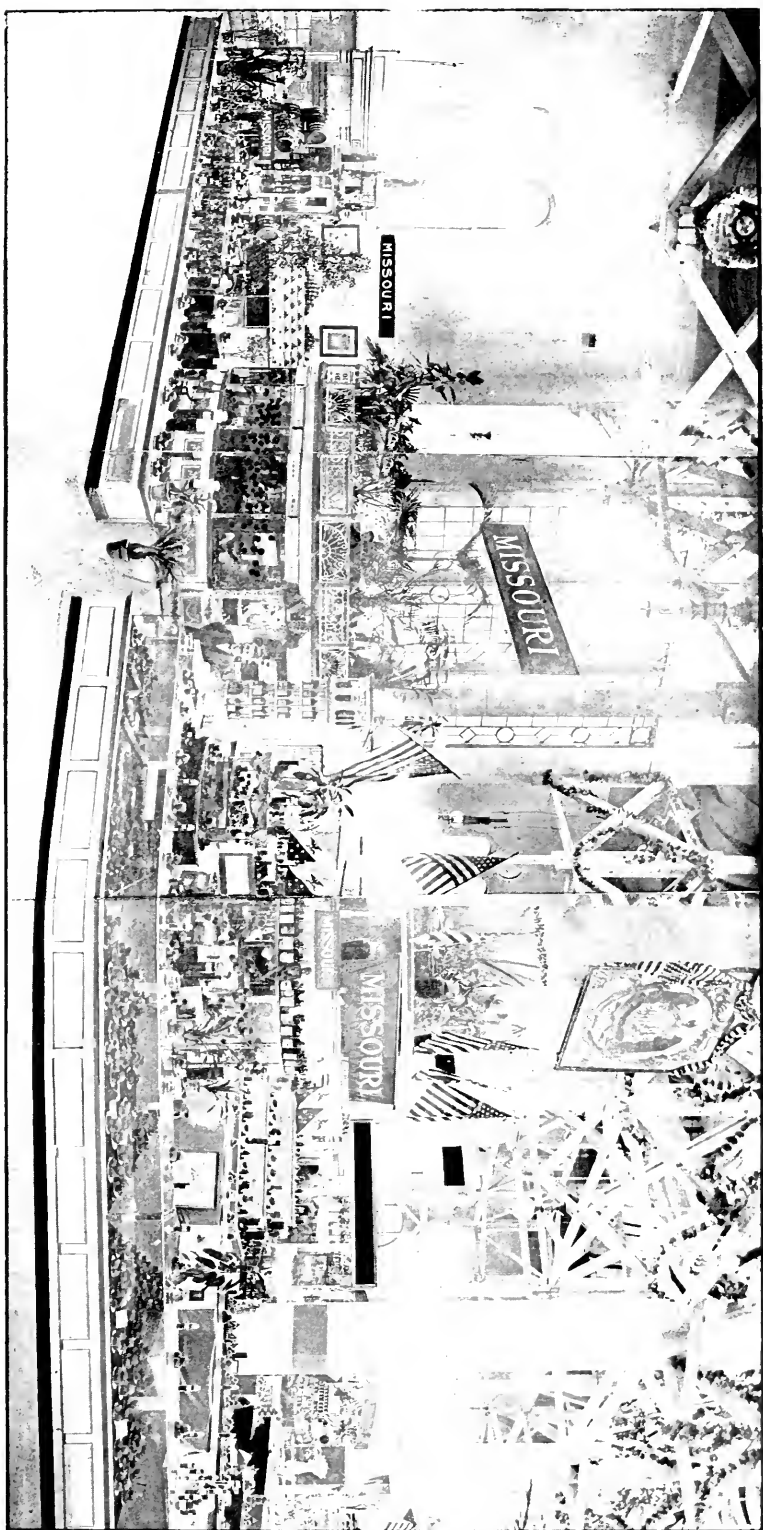
One (the Wilder Medal) to the State Horticultural Society.

One to the Stone Hill Wine Co., of Herman, Mo.

One to the State Agricultural College for preserved fruits and pickles.

One to the Clarksville Cider Co. for apple cider and vinegar.

One to the State of Missouri on apples.



MISSOURI EXHIBIT AT BUFFALO, 1901.

SECRETARY'S REPORT, Dec. 5, 1901.

Under the most favorable circumstances do we meet again in this rich and beautiful city of St. Joseph. The year has been a notable and a prosperous one for the horticulturist in most parts of the State. The spring opened with the most encouraging outlook for the farmer as well as the fruit grower, only to have these hopes dashed to the ground by the drouth, which began on April 17th and extended far into the summer in many parts of our land. Until July 19th no rain fell in the State and even then only local showers here and there served to give us hopes that rain would come again. In spite of the worst drouth we have known for thirty years, when the hay crop was less than one-fourth and the corn crop less than one-tenth, we find our apple and peach orchards giving some of the most wonderful returns we have seen for ten years. This is notably true where orchards were young, healthy and well cared for.

The report sent out by the Society in July has fully justified that report and while the crop has been a phenomenal one in many parts of our State, yet there have been complete failures. The short crop predicted in the East has been a reality and the good prices here have been to our gain. Many an orchard has brought its owner more money for the crop of fruit than the entire farm could have been sold for, in the spring or summer. Notable instances can be given where \$40, \$60, \$100 and even \$200 per acre have been secured for the crop of apples or peaches. The dry weather seemed to have made havoc with the insect pests and the fungus diseases and in many instances (not all by any means) almost perfect fruit was the result. At no time in our experience probably were the beneficial effects of thinning so plainly to be seen. In those orchards (apple as well as peach) which were properly thinned once, or even twice, the perfection and size of the fruit was a very notable one. *It pays to thin fruit.*

The work of the Society began after our June meeting in the repacking of the apples in cold storage in Kansas City, so kindly held there free of charge by the Armour Packing Co. These 28 barrels of fine specimens were sent to Buffalo to Mr. C. C. Bell, our commissioner, and used by him as needed. The report on this display will be made by him to the State Commission and we shall then know how the awards have been given.

Purchase of Glass Jars.

Sometime during the summer I found an opportunity to purchase over 200 large glass jars (some of them filled with fruit) for exhibition purposes. This collection cost the company who owned it over \$500.00, and, after some attempts, I bought them for \$50.00 for the use of the Society. I have secured some boxes and will pack them, ready to be filled with fruit this next summer for use at the St. Louis Exposition, when we will be expected to take up the preparation of a fruit show for this, the greatest of World's Fairs.

The St. Louis Exposition.

About the only important points I wish to call to your attention are first, *the classification*. There is danger of the authorities putting the department of Horticulture under the Superintendent of Agriculture instead of giving it a distinct head and standing of its own. Horticulture has become such an important feature in our nation that we desire and claim a separate department for its best exhibition, and above all we want a thoroughly competent and worthy man to be the Superintendent of Horticulture. We do not want our interests to be made a sub-head of any other department, and especially not to be under the control of any one not specially interested in our line of work. It would be well for this Society at this meeting to present to the Fair authorities our wishes in this matter by some strong resolutions in favor of Horticulture standing on its own foundation and making its own display. A committee is needed for this.

The second point important for us to consider is the planing for our State display. There should be money enough at our disposal to make by far the greatest show ever attempted, and it means a lot of good, hard, systematic work during this summer in the preparation of fruits, and, during fall, a collection of the finest specimens grown in the State, to be held for the next summer's use, before fruits begin to ripen. Then during the time of the Fair we should be ready to keep up a show of fruits, as they ripen, in a large way, so as to show as nearly as possible all the varieties of fruits grown in Missouri as they ripen.

To this end we should have a specified amount set aside for the use of Horticulture in this display. While I have no doubt that this will be properly done by those in authority, yet I have always found that the best plan to get things done right, is to prepare a plan, ask for a share, show the importance of our cause and submit it all, with arguments, to the powers that be.

The Orchard Question

Is *the* great question for us to consider. It does seem to me that more and more serious questions arise which are hard to settle and, when once settled to our satisfaction, they come up another year to unsettle us once more. This past year has been one of these times and we must confess ourselves at a loss for some of our theories and practice. The drouth, the cold, and again the drouth has put us at our wit's end to know what best to do in all cases. Our experiences must be kept in mind, not only for one year, but for a series of years, before we can be sure of results. We too quickly jump at conclusions and are not willing to wait until facts will justify a conclusion. If we will only remember what Dr. Laws of England says, we would not be so hasty in giving as facts, simple experiments. He says that "no result can be proven until 30 years' experience justifies it." How differently do we act.

No season like the last have we ever had which seems to enforce the idea of more care in the selection of our trees before planting.

The wonderful difference in the color and size and quality of some of our varieties seems to show more and more conclusively that certain strains in varieties perpetuate their characteristics as surely as do varieties. I believe this to be true, and, if true, then I wish to again *emphasize* the points I made in my report at the Trenton meeting, "That we should always select special trees to get the specially desirable qualities we wish to propagate." Add to this then the other strong point, "Good seedlings from selected fruit of the best hardy varieties, and select seeds from this fruit," which we should always use, and I think we have more than half our "orchard question" settled.

Good seedlings grown from well selected seed, taken from the best and most perfect fruit, from the most productive and best trees, and these roots grafted with scions taken from special individual trees having the best color, most uniform fruit of the best quality from the most productive and hardy trees will surely give us results that will surprise and delight our hearts and fill our pockets.

Samuel Miller and A. Nelson, Second Vice-President and Treasurer, died so closely to one another that it seems like a single funeral but a double loss. The first time in our history that two deaths among our officers while on duty has ever occurred.

Judge Miller's name has been an household word for so long a time that we hardly remember when it was not. He was a man wholly devoted to his profession of Horticulture. No more unselfish man ever lived in our State, and among fruit growers, noted for their unselfishness, he

stands a peer of them all. It never occurred to him to see "if it would pay" in any of his experiments, but with only one idea in mind, "to succeed in giving facts to others," he ploded day after day and year after year. No man ever loved to see trees and plants or flowers and fruit grow more than did Judge Miller. I really believe that he took more genuine enjoyment in finding a new flower or in the ripening of some new fruit which he was testing, than would the finding of a thousand dollars.

He often said when appealed to that he should make some money out of his new fruits or the results of his experiments, "that he had no time to make money." He was an enthusiastic tester of new fruits and nearly every originator of new fruits took occasion to send him some trees or plants of the variety if it was good, but never if it was a humbug, because he was sure that Judge Miller would tell the truth as it appeared to him.

To him this State owes thanks, and honor, and wealth, for his life of consecration to the fruit interests of the State. Something that we can never repay, so say we all of us.

He has left as part of his labor the Captain Jack strawberry, one of the best of its class; the Martha grape, one of the sweetest white grapes we know.

In the death of A. Nelson the Society loses one of its best workers. A man of untiring energy, never shirking his share of work, enthusiastic in everything he undertook in Horticulture, but especially a devoted apple man. A new apple or one wanting identification always awakened his interest and he would spend hours in studying a collection of apples, just to know them. He was one of the best posted men on varieties that we have in our Society. A man of intense sympathy and always true to his friends. A prominent man of South Missouri stated to me the other day: "We had a prominent man of South Missouri who was honored by his State and by our nation to a great degree lo! these many years, but I say that Mr. Nelson accomplished more permanent good to our State and has done more for its development than this great man did in all his life." It has been my good fortune to be associated with him in our State work and I can gladly attest his sterling worth.

COLD STORAGE was never so much used in the west as this year. Every storage is filled to its utmost capacity, and still buyers were calling for room. The success of the storage season will give an increased demand for its use. More and more have we been convinced of its utility, but the only question, like the matter of spraying, to be settled was, when, what, where, how? So we have come to believe in it and practice it more and more. We are glad to know that we now have promise of one of the best institutions of its kind in our country,

to be put up at Kansas City, during this coming year. We have often told them that if they could give us a storage that they could guarantee to give us (at the end of 2, 3, 4 or 5 months after putting our apples in storage) our fruits back in the same condition that they took them, there would be hardly any end to the amount of storage that could be used. This I understand can be done and will be done by this new cold storage company.

The work of the Society has been to awaken just such a working and reasoning power in all our fruit growers, and results are beginning to show all over the State. The apple buyers in their hunting for apples last fall were located in an hundred different localities over our State. The fruit-growers were well posted as to demand and supply by the reports collected and sent out through the Society, and most of them acted upon the information and secured good prices for their apples, and it brought millions of dollars into the State. If any failed to be informed on the subject, it was their own fault, for the information was published far and wide. I know that the fact sent out to the world, that we had a good crop in many parts of our State, and that most of other states had a very light crop, was worth more to our State, ten times over, than all the Society has cost the State in all of the forty-four years of its existence.

If there ever was a time when we should come down right to business principles in all our planting, growing, pruning, cultivating, spraying, packing, marketing and storing, it is at the present time. Business methods in all our fruit-growing, studying our adaptation, knowing our soils, utilizing every item of experience, watching what nature does under our dealings with her, dropping all prejudice, removing all jealousies about our plan, eyes and ears open to the silent voices of our trees as they grow, hands ever ready to respond to her call, brain ever alert to reason, and think and see, and above all, to "draw conclusions from what we see," not wildly, not blindly, not ignorantly, but intelligently reading nature aright, and we shall soon see the greatest development in all our fruit interests that we ever dreamed of. To this end we must work and think, and study, and results will surely follow.

L. A. GOODMAN.

ELECTION OF OFFICERS.

D. A. Robnett was nominated for President, and motion was made and carried, the rules be suspended, and the Secretary be instructed to cast the unanimous vote of the Society for Mr. Robnett as President.

After the nomination of G. T. Tippin for First Vice-President, a motion was made to suspend the rules and instruct the Secretary to cast the Society's ballot for Mr. Tippin as First Vice-President. Motion carried.

Nominees for Second Vice-President were C. W. Murtfeldt and C. H. Dutcher. The vote being taken, Mr. Dutcher was elected by majority of eighteen to fifteen.

It was moved and seconded that C. W. Murtfeldt be made Third Vice-President for life, and the motion passed unanimously.

W. G. Gano being nominated for Treasurer, the rules were suspended by motion, and the Secretary cast the ballot for Mr. Gano as Treasurer.

On the nomination of L. A. Goodman for Secretary, motion was made and carried to suspend rules and have the President appoint some one to cast the ballot of the Society for Mr. Goodman as Secretary. The President appointed J. T. Snodgrass to cast the vote as per motion.

List of officers elect:

D. A. Robnett, President, Columbia.

G. T. Tippin, First Vice-President, Nichols.

C. H. Dutcher, Second Vice-President, Warrensburg.

L. A. Goodman, Secretary, Kansas City.

W. G. Gano, Treasurer, Parkville.

C. W. Murtfeldt, Third Vice-President, Kirkwood.

The newly elected officers expressed their appreciation for the honor bestowed, and thanked the Society for the confidence reposed in them, in electing them as officers.

ST. LOUIS EXPOSITION.

President Murray—We will now hear from the Commissioner on the St. Louis Exposition.

Mr. F. J. Moss—Mr. Chairman, Ladies and Gentlemen:

I will not try to make a speech because that is not in my line of

business, and I am keeping pretty busy in my own line of work nowadays. I am a member of the World's Fair Commission, which Fair you know will be held in St. Louis in 1903, and I am here to say to you that the members of the Commission appreciate the possibilities of the industry in which you are interested in this State, and the appropriation made by the Commission for Horticulture, I think, will be the most liberal appropriation that will be made by the Commissioners. You, of course, understand that it is not possible for the Commissioners to do this work alone.

I am very glad to see such a splendid organization here, and I want to say to you that we stand ready to act on any suggestion this Horticultural Society will offer, and stand ready to back you with almost any reasonable expense. We want you to go into this contest against the world and carry off the laurels, just as you have at Buffalo, and from the Governor on down the line to every member of the Commission, they are just head and hand in this work, and they want your assistance. You are practical in your line of business, and if there is anything we do believe in, it is men who understand the business they are working in. We want them to handle that particular branch of the business. We want you to take this matter up at this meeting, and map out a plan. It takes time to do work right. Map out your plan and make it known to us, and you will have our co-operation at every point.

I wish to thank you, gentlemen. I just came to tell you that we are awaiting your commands, and will try to do the right thing.

St. Louis, Mo., December 4th, 1901.

N. F. Murray, President Missouri State Horticultural Society, Odd Fellow's Auditorium:

On behalf of the Louisiana Purchase Exposition I send you greeting, and trust your meeting may have the greatest measure of success. I am confident that when the Exposition is opened and during its continuance the Horticultural interest of our beloved State will be most thoroughly cared for.

DAVID R. FRANCIS, President.

On motion of Mr. Irvine of St. Joseph, the matter of the St. Louis Exposition was referred to the Executive Committee to confer with the State Commission. Said motion carried.

PLACE OF NEXT MEETING.

Mr. Hopkins named Springfield for the next Annual Winter Meeting. Warrenton also asked for the Winter Meeting.

Eldon asked for the Summer Meeting.

The place was referred to the Executive Committee.

Warrenton, Mo., December 4, 1901.

Mr. L. A. Goodman, St. Joseph, Mo.:

Dear Sir—We herewith enclose invitations to hold your next Winter Meeting with us. We regret that we can not be with you this year. We hope you will meet with us here next December. We are so near the World's Fair City, and hope you will give us a chance. The Wabash railroad, as you will remember, last year promised us one-half fare, and no doubt will do it again. Wishing you a successful meeting, we remain

Yours very respectfully,

POLSTER BROS.

Warrenton, Mo., December 2nd, 1901.

To the State Horticultural Society of Missouri:

Gentlemen—With great pleasure we extend to you the invitation to hold your next Winter Meeting at Warrenton, Mo., 60 miles west of St. Louis, on the Wabash railroad. Courthouse and college buildings will be placed at your disposal; also hotel accommodations at a very low rate.

Very sincerely yours,

POLSTER BROS.

Fruit Growers and Nurserymen, Warrenton, Warren County, Mo.

Warrenton, Mo., December 2nd, 1901.

To the State Horticultural Society, St. Joseph, Mo.:

I extend to you the invitation of the people of Warrenton, Mo., to hold your next Winter Meeting with us.

We have large spacious rooms which will be put at your disposal. Hotel accommodations are first-class, and the hospitality of the people of Warrenton is second to none. Hoping that you will see fit to meet with us and accept our "open door policy" I am,

Respectfully,

F. J. TAINTER, M. D., Mayor.

Warrenton, Mo., December 4, 1901.

To the State Horticultural Society of Missouri, now in session at St. Joseph, Mo.:

Gentlemen—We take pleasure in extending to your honorable body,

in behalf of Central Wesleyan College, a hearty invitation to hold your next Winter Meeting at Warrenton, Mo., a beautiful college town on the Wabash railroad, situated sixty miles west of St. Louis.

Buildings for your exhibits and meetings will be placed at your disposal gratuitously and entertainment furnished at a low price.

Yours respectfully,

CENTRAL WESLEYAN COLLEGE.

Wm. Koencke, President Board of Trustees; J. M. Rinkel, Treasurer.

BITTER ROT OR RIPE ROT OF APPLIES.

(J. T. Stinson, State Fruit Experiment Station, Mountain Grove.)

The damage done by bitter rot to the apple crop in South Missouri this year was small compared with the loss caused by the disease last year, when fully fifty per cent. of the apple crop of South Missouri was damaged by the disease. The apple growers are much interested in this subject, owing to the fact that the disease is largely controlled by climatic conditions, and that they are liable to have a recurrence of last year's loss any season, should the conditions be favorable for the development of the disease. It is a fungus, and hot weather is necessary for the rapid development of the spores and the spread of the disease, while cold weather checks it.

The small round spots that appear on the surface of the apple are usually easily distinguished from other diseases. The spots are often not larger than a pin head when first noticed, and they increase rapidly in size if the weather is extremely hot. Pustules appear in the center of these spots when they are about the size of a silver dime. These do not spread over the entire spot, but are massed near the center, and it is through the pustules that the spores of the disease reach the surface. The masses of spores that exude can sometimes be seen with the naked eye, and when this accumulation is put under the microscope it is found to be composed of a countless number of spores. These spores are either blown away by the wind or are washed off by the rains.

Last year we sent out from the Experiment Station a large number of circular letters of inquiry to the best informed fruit growers of the State, for the purpose of collecting information regarding this disease, and it was the general opinion of all of them that warm weather was necessary for its development and that cold weather checked it. There was a difference of opinion, however, regarding the amount of moisture necessary. In some of the reports it was stated that mois-

ture was absolutely necessary, and that damp weather assisted in the development of the disease. It seems that this was the universal opinion of men who had been studying the disease quite closely. However, this year the disease developed rapidly in some orchards without rains, for in South Missouri there was a long period during the summer and fall in which we had practically no rain fall, yet the disease was spreading quite rapidly about September 1st, in some orchards, but we were fortunate enough to have a cold spell of weather which permanently checked it.

Usually this disease does not make its appearance until the apples are nearly grown, but the present season specimens of apples affected with bitter rot were sent to the Experiment Station about the middle of July; however, the spread of the disease was not rapid at this time, and but few of the apples were affected.

The question that I am to speak on is concerning experiments that we have carried on to prevent, if possible, this disease. Last year in the experiments carried on by the station it was found that the disease could be prevented by the use of Bordeaux mixture, and a record of the results of the work is given in Bulletin No. 1, from the Fruit Experiment Station, however, it might be well to mention them again.

On Plot No. 1, sprayed five times with Bordeaux mixture during the season, fifty-nine per cent. of the fruit was free from Bitter Rot, while on the unsprayed plot adjoining only one and six-tenths per cent. of the fruit was free from Bitter Rot. On another plot sprayed four times during the season seventy-eight per cent. of the fruit was free from Bitter Rot, while on the unsprayed plot but nineteen per cent. of the fruit was free from the disease. This shows unquestionably the advantage of spraying. Similar results have been obtained previously in other orchards.

This year experiments were planned at the Experiment Station practically on the same plan as those of last year, except that they were somewhat more extensive, as they were carried on in several orchards in co-operation. We carried on co-operative spraying experiments at Dorchester in Mr. Henry Scholten's orchard, and at Mountain Grove, and in co-operation with the United States Department of Agriculture experiments were conducted in the orchard of Mr. S. L. Haseltine at Dorchester, and the Olden Fruit Company at Olden. Mr. H. von Schrenk, who is connected with the United States Department of Agriculture, co-operated in the work at Mr. Haseltine's and Mr. F. W. Faurot, also of the United States Department of Agriculture, in the work at Olden.

The work was carefully done in each of these orchards. Great care was taken in making the mixtures and applying them. In each case a thorough application was made; at every spraying the trees and fruit were covered with the mixture. In each orchard where we carried on spraying experiments this year there was but a small per cent. of bitter rot, so we are unable to report any definite results as far as the prevention of that disease is concerned, except that in the orchard at Olden, and also in the Mountain Grove orchard, there was some less bitter rot on the apples under the trees as well as those on the trees, in the sprayed plots.

There was practically no apple scab either on sprayed or unsprayed plots in any orchard where experiments were conducted this season, so we are unable to report any definite results as to the prevention of this disease. As we had but little Bitter Rot and no Apple Scab, experiments as far as these diseases are concerned are of little value. But there is a point connected with the work that I believe is valuable to us, especially to the fruit growers who are carefully studying the business. The first applications of Bordeaux mixture in practically all of the orchards sprayed, in the experiment work this season, rusted the apples more or less. However, the rusting of the fruit by the spray mixture was not confined to the plots under the control of the Experiment Station, but orchardists who carried on spraying work also had damaged fruit from rust. I am informed also that this damage to the fruit was not confined to South Missouri, but is quite general the present season. The reason for this is hard to account for, however I thought it best to mention these facts simply that we may arrive at some conclusion that will be of benefit in the spraying work hereafter. I believe in spraying apples for Apple Scab, Codling Moth and Bitter Rot. I believe that it will pay many times over what it will cost one season with another.

We have used the liquid mixture exclusively in our experiment work at the station, but we expect the coming season to carry on experiments with the dust machines, using the dust mixtures, and I hope that we may be able to obtain results that will justify using this method of spraying a part of the season at least. If the dust method is practical and will do the work satisfactorily it will be more convenient to apply than the liquid spray.

In the spraying experiments this season some plots were sprayed throughout the entire season. The first spraying was given in April and the last about the middle of August. The trees and fruit were kept covered with the mixture during the entire season. Other plots were given two and three sprayings earlier in the season and the

later sprayings were omitted, while still other plots were given the later sprayings only. It was found in all this work that the injury to the apples was confined to the early sprayings. In some of the orchards arsenite of lime was used, in others arsenite of soda in connection with the Bordeaux mixture, and it was thought by some that the injury was due largely to the arsenite. However, in other orchards where Paris green was used, and in one orchard where Bordeaux mixture was used alone, there was the same damage by the rusting of the surface of the fruit. We noticed, however, that on all trees that were not affected by the drouth this year the amount of fruit affected was practically nominal, not enough to effect the marketable product; but on trees injured by the drouth the amount of fruit damaged was greater. It seems that where the trees were not affected by the drouth that the apples outgrew the injury done earlier in the season.

It may not be out of place to mention the value of cultivation in orchards. The apple men who packed the fruit in South Missouri this year practically all say that in orchards that were thoroughly cultivated during the season it was possible to barrel up as many apples as the buyers and owners expected that they would; while in the uncultivated orchards in most cases there were about one-half as many barrels per acre as estimated earlier in the season. This shows the benefit of thorough cultivation during a dry season. I would emphasize this point in connection with this, that in uncultivated orchards the mixture injured the fruit, and on account of the drouth the apples were unable to recover, while on others given the same number of sprayings the fruit was practically all marketable, being more thrifty on account of the cultivation given.

In the orchards where the experiments were conducted this year some of the owners were apprehensive of the result, and feared that a part of the crop was damaged. In all cases there were as many barrels of marketable apples taken from the sprayed plots as from the unsprayed, and usually there was a somewhat larger per cent. from the sprayed. However, the yield was not increased by the spraying the present season as it usually is, for often the yield may be increased fully one-third by spraying.

There is another point connected with the spraying work conducted by the station that may be of interest. In our experiments at Mountain Grove we found that the trees sprayed last year set much more fruit the present season than the check plots adjoining. This is an important point and I hope that there are others present who will give us some testimony along this line.

From the results obtained this season I believe that it would be

advisable to plan the experiments for the coming season so as to spray for Apple Scab and Codling Moth early in the season, giving one spraying just before the trees bud out, and another after the blossoms fall, and if the weather is wet another in about a week or ten days; and then not begin the work for bitter rot until about July 1st, as this disease does not begin to spread until the warm weather of summer. This season there was no rapid development of bitter rot until in August. I believe that this is a better plan than it would be to carry the sprayings on through June, as it will lessen the sprayings somewhat and still give good results.

The formula that we used this season was five pounds of copper sulphate, and five pounds of fresh lime, to fifty gallons of water.

Regarding the injury to the different varieties, the injury done was practically confined to the Ben Davis variety, except that the Huntsman was injured to some extent in one orchard. Willow Twig, Winesap and Smith's Cider were not injured by the spray at all. It seems that the Ben Davis apple is more susceptible to this injury than the other varieties.

As we have been discussing this subject somewhat informally I would like to ask that any one present interested in spraying work would ask any questions that may occur to them, and also bring up any phase of the subject that may be of interest in their particular section.

A question: What was the nature of the injury?

Simply roughened the surface of the apples. There is no question about this, because on the unsprayed plots the apples were more highly colored and there was no rust on the surface at all. It has also been suggested that it was possibly due to the strength of the mixture used. I am inclined to think that if we had used a little more lime and less of copper sulphate the same damage would not have been done. However, a prominent fruit grower at Farmington, Mo., told me the other day that he had used three pounds of sulphate of copper and six pounds of lime, and his apples were also injured by rusting caused by the spray. In the orchard belonging to Mr. Henry Scholten, where we carried on co-operative spraying experiments, in a part of the orchard more lime was added to the mixture, and it was found that the injury was less where the additional lime was used, nevertheless there was some injury to the fruit there.

A question: Is it a fact that the cuticle on the injured apple is thinner than on other apples not injured by the rust?

I am of the opinion that this is a fact. As stated before the injury was confined principally to the Ben Davis variety, while other varie-

ties given an equal number of sprayings during the season were not injured by the spray.

A question: Is there any particular position that you noticed on the apple where the bitter rot first attacked it?

No, there is no particular point on an apples where bitter rot first attacks it as far as I know.

A member: I noticed in my orchard, for a year or two, that it was the side of the apple that hung to the south that it first attacked.

That is a fact, as you probably noticed the apples on the south side of your trees were first attacked, and then, naturally, on the outside, or on the south side of the apple.

A member: Nearly always on the side hanging to the south.

In all orchards in South Missouri last year the first injury was on the southwest side of the trees, and naturally it would be on the south side of the individual apple, but as to any particular point where the bitter rot first attacks it, there is none. The statement is made sometimes, and I have seen it in print, that it is necessary for an insect to injure apples before bitter rot could take hold. That must be a mistake, because this year, and last year more especially, from one to twenty-five and even forty of the bitter rot specks were on one apple.

A question: Is any one variety affected worse than others?

Yes, sir; Willow Twig was the worst, and Ben Davis, Little Red Romanite and Huntsman are all subject to the disease. I do not think it would pay to plant a Willow Twig tree in any orchard in South Missouri.

Now regarding a few preventive measures for Bitter Rot. As is known the spores live over the winter in the mummied apples and on the trash, etc., under the trees and between them. In our experiment work at Mountain Grove we took out everything from under the trees, every mummied apple and all trash of any kind, and scraped the ground with rakes several times. Unquestionably there is a difference when this is done and when it is not, in the amount of spores that attack the fruit, whenever the season is right for it.

This year, in studying the disease, we found that bitter rot attacked the trees differently than it did last year. Last year it usually made its first appearance on the southwest side, and often high up in the tree. This year we found that it made its first appearance on the fruit on limbs growing near the ground, and that it gradually spread to the higher branches. This should teach us the value of cleaning out all of the mummied apples and the trash from under the trees.

Mr. Maxwell.—As was said by Mr. Murray, we are not so much

interested in North Missouri in regard to bitter rot, but I want to ask you a question. You gave the preference in spraying largely in favor of the liquid process. It seems from your talk that you also employed the dust process. I would like to know how you got up your mixture for the dust process, as to how you prepared it, and as to whether you gave it an equal show with the other?

I spoke of the liquid process because I have used it for years, and we used it exclusively in our experiments. The other I have not given a thorough trial. I made the statement awhile ago that I had not given it a thorough trial, and when I do, and am thoroughly convinced that it is as successful as the other I will be glad to recommend it.

I believe that spraying is necessary for perfect fruit, and that orchardists who expect to put a good product on the market will necessarily have to spray their fruit. In reply to inquiries that have been made I am pleased to state that on all plots sprayed during the season, where arsenites were used, that we had a much smaller per cent. of Codling Moth than on unsprayed plots.

Thursday, December 5, 2 p. m.

The Committee on Fruits made their report.

Major Holsinger read the report and it is as follows:

FRUIT REPORT.

Ford Kenedy, Parnell, Mo., 2 varieties apples.....	\$1 00
L. V. Dix, Jefferson City, 8 varieties apples; 1 variety pears; 2 varieties peaches	3 50
S. H. Linton, Des Moines, Ia., 6 varieties apples.....	1 00
H. W. Jenkins, Boonville, Mo., 6 varieties apples; 4 varieties peaches	2 00
Titus N. Company, Nemaha, Neb.....	50
C. B. Long, Amoret, 5 varieties apples.....	1 50
J. H. Karnes, St. Joseph, 18 varieties apples.....	5 00
C. W. Steiman, Dalton, 1 variety.....	50
J. H. Marion, Fulton, Mo., 17 apples; 1 persimmon.....	5 00
H. W. Cook, Potosi, Mo., 9 varieties apples.....	2 50
G. W. Odor, Holt, Mo., 10 varieties apples.....	2 50
W. S. Martin, Dekalb, 2 varieties apples.....	50
T. H. Jones, Eldorado, Kas., 5 varieties apples.....	2 00
Wm. Byler, Wheeling, 3 varieties apples; 1 pear.....	1 00

J. Brozelton & Sons, Wathena, Kas., 10 varieties named apples and 2 varieties unnamed.....	5 00
H. B. Francis, Mulberry, 11 varieties named apples and 1 variety unnamed	4 00
W. J. Wilson, St. Joe, 7 varieties apples; 1 variety pears.....	3 00
A. W. Zimmerman, Amazonia, 3 varieties apples.....	1 50
S. R. Walker, Liberty, 2 varieties apples.....	1 00
G. Gutekunst, Moberly, 3 varieties apples.....	1 00
Olden Fruit Co., 9 varieties apples.....	2 50
D. A. Robnett, Columbia, 31 varieties named apples; 1 variety unnamed; 2 varieties pears; 1 variety peaches.....	7 00
A. Nelson & Son, 40 varieties apples.....	9 00
St. Joe Horticultural Society, 46 varieties apples; 2 varieties pears; 2 varieties peaches; 5 varieties crab apples; 5 varie- ties grapes	10 00
H. J. Hartman, Crosby, Mo., 21 varieties apples.....	4 00
M. Butterfield, Farmington, 16 varieties apples.....	4 00
J. W. Clark, Amazonia.....	50
H. R. Wayman, Princeton, 12 varieties apples.....	3 00
F. H. Speaksman, Neosho, 7 varieties apples.....	2 00
G. T. Tippen, Springfield, 11 varieties apples.....	3 00
D. Loo Miller, Parkville, 15 varieties apples; 1 variety peaches.	4 00
W. G. Gano, Parkville, Mo., 19 varieties apples; 1 variety peaches; 2 varieties artificial.....	5 50
Ozark Orchard Co., 11 varieties apples.....	6 00
Mrs. A. Z. Moore, Mountain Grove, 18 varieties.....	5 00
Prof. Stinson, Mountain Grove, collection seedling apples.....	4 00
Seedling apples from Experiment Station, by Prof. Stinson.	
Beach—of fine color, size and good quality.	
Cherokee—Good size and color, but poor quality.	
One good color and fair size; good quality.	
Highfield—Good size, good color; only fair quality.	
Gibbon—One of a beautiful apple, but of poor quality.	
Higes—A fair apple; good size color and fine quality.	
J. H. Jenkins, Spring Garden—Seedlings.	

We, your committee, report that we find the tables covered with a splendid show of fruits that is a revelation to horticulturists.

The show of apples surpasses anything we have ever seen at a State meeting wheresoever attending. For size, color and beauty they are unexcelled. As for quantity they were lavish, there being more than 1,000 plates of apples.

Of pears, peaches, grapes, persimmons, evaporated and canned fruits there was a good supply and a creditable showing. The amount of money to repay for so good a display is really inadequate and your committee regret their inability to give something commensurate to the fine exhibition.

F. HOLSINGER,
E. J. BAXTER,
F. J. STINSON,
G. F. ESPENLAUB.

Your committee find on exhibition some very fine named and some unnamed seedling apples from South Missouri and North Arkansas exhibited by Mr. Stinson of the South Missouri Experiment Station at Mountain Grove. We have duly sampled them and we find some of them of most excellent quality, and we would suggest that they be given a thorough trial to determine their value in commercial and family orchards. We also find several seedling apples exhibited by Mr. A. Nelson of Lebanon, which have attracted our favorable consideration, also one by Mr. Butterfield of Farmington, Mo. We also find two apples exhibited as new seedlings by Mr. J. H. G. Jenkins of Spring Garden, but your committee can arrive at no conclusion as to the same. All of which is respectfully submitted.

Your committee also find a seedling apple exhibited by Mr. Tomkins of Warrensburg. This apple is red striped, of large size and fine appearance, but deficient in quality, perhaps due to being kept too long, and we can make no recommendations. Likewise one from Wm. Howell, Wappapello, but do not consider it of enough value so far as known to name or advise for propagation.

We mention also an exhibit of fruits from Conrad Hartzell kept by his method.

Signed by committee.

Spring Garden, Mo., Dec. 2, 1901.

Secretary L. A. Goodman:

I regret that I cannot be present at December term of State meeting, but send you samples of a new seedling apple with which I captured the first prize on "Best Plate of New Seedling Apple" at the "Queen City Fair," Springfield, Mo., in the fall of 1898.

Awarding committee were all experts, with such men as Judge Hopkins of that city in the lead. The tree is identical in appearance with "Yellow Bell," but the fruit is regarded here as larger and finer flavored than Grimes Golden and a genuine winter apple. It is certainly a cross between Golden Pippin and Bell Flower, with possibly a slight infusion of the blood of White Winter Pearmain. It bears every year;

yielded 6 or 7 bushels this year; and if anybody wants to know how it is esteemed here, address W. S. Allee, physician and surgeon; Jas. Hite, druggist; H. A. Weinake, merchant. Respectfully yours,

J. H. JENKINS,

Olean, Missouri.

Spring Garden, Mo. Dec. 3, 1901.

Hon. L. A. Goodman, Secretary Mo. State Hort. Society:

Dear Sir—I sent you yesterday by express two average samples of my new seedling apple and want your opinion, and that of the Society concerning it. I trust it will prove a valuable acquisition, as it has borne a full crop every year since it came into bearing.

Believing it a genuine cross between Golden Pippin and Bell Flower, I named it "Golden Bell." Samples sent were medium size—not the the largest—and the award given at the "Queen City Fair," with the commendation of many good people here, ought to render it worthy of a passing notice, at least.

Yours for horticultural progress.

J. H. G. JENKINS.

The Committee on Obituary made their report as follows:

Mr. Murtfeldt: I think, perhaps, the whole audience is in sympathy with the words expressed in these obituary notices, and if that be the case, I will ask our worthy President to call this assembly to rise for a moment in an instant silent prayer. I make that as a motion. Carried.

The audience then arose for an instant in prayer.

IN MEMORIAM.

The Missouri State Horticultural Society meets this year under the shadow of grief; two of our most honored members, both officers, have passed away. Both these brothers were strong men of marked personality. We all miss the genial presence of Judge Samuel Miller, the energetic, masterful A. Nelson. Both found their greatest happiness, excepting at their own firesides, in the meetings of this Society. We sorrow at missing our brothers today.

Judge Samuel Miller was born in Pa., October 4, 1820, and came to a ripe old age, dying Oct. 24, four score and one years old. He was honestly personified, "the noblest work of God," and could not tolerate duplicity in any form. Early in life he was elected a justice of the peace, but never tried a case; he was all that such an officer should be, a peace man. As a Horticulturist he was a real von Munz, trying, experimenting, and hard to move when he considered his conclusions correct, but ready also to acknowledge a mistake. He was very unselfish;

when he saw or realized a good point in any fruit he gave it to the public through the press, as a regular staff correspondent of the *Rural World*. His Christian faith was most striking and pure; he was a good man whose works do follow him.

This State Horticultural Society appreciated his labors, and, perhaps, he laid down his life in its service. His pure unselfish life preaches an eloquent sermon to our Society, and may God give us grace to follow his beautiful, ever enriching life and example. The Agricultural and Horticultural papers and the Secretary's report have each laid a laurel wreath upon his bier; may this be added to the same and be evergreen in our hearts and memories.

A. Nelson was born in Oneida county, N. Y., September 8, 1830. In 1858 he moved to Buffalo, where he engaged in the grain and coal business, and for 25 years was a resident of that city. His first years were spent on a farm, and he always took great interest in Horticulture. Being an earnest man, he naturally took part in politics, was a candidate on the State ticket the year the opposing party won. In 1883 he moved to Lebanon, this State, coming as agent for the Ozark Plateau Land Co., a Buffalo corporation, and for 19 years he acted as resident manager. For many years he was Treasurer of the Missouri State Horticultural Society, and he contributed to all the great fruit exhibits that the Society made during his lifetime here. He also made many personal collections at fairs, thus contributing greatly to bring honor and reputation to the Ozark apples and peaches. In Horticultural work he was untiring, and his enthusiasm was contagious. A few months ago Mr. Nelson was appointed a member of the State Board of Agriculture. He took part in the Farmers' Institute meetings the week before he was taken sick, and spoke with enthusiasm of apple prospects. He was taken suddenly ill, and after a week's suffering, passed on to rest, sustained by his faith, at peace with all, and with loved ones at his side. The funeral on the 12th. was largely attended. The floral offerings from home and distant friends were beautiful. Having been so conspicuous a champion of the apple it was fitting that a pyramid of this fruit should stand by the side of the casket.

Mrs. Nelson, his companion of 44 years, and his four sons and a daughter, who will carry on his work, have the deepest sympathy of all.

Resolved, That the foregoing be entered upon the minutes of this Society, and that the Secretary be instructed to transmit a copy of these testimonials to the family of these departed comrades.

G. A. ATWOOD,
C. W. MURTFELDT,
J. C. EVANS,
F. WELLHOUSE.

Secretary Goodman—I want to make a motion that the next report of our Society include the pictures of friends Nelson and Miller, a half tone page for each of them. Carried.

President Murray—We are on the question of Bitter Rot. We will hear from Prof. Von Schrenk on Bitter Rot.

Prof. Von Schrenk—Mr. President, I just wish to take a moment or two to pass around some photographs of this Bitter Rot, and some photographs of those potato apples that we raised from those plats that Prof. Stinson spoke of. I simply want to add a word to what Prof. Stinson said about this experiment we made in connection with this Bitter Rot. Some of you will remember that we outlined a plan to get at the trouble—how this Bitter Rot spreads and how it works.

In want to echo a sentiment spoken of by Mr. Goodman in his report, in which he said that you want to wait thirty years before you come to a conclusion, and I want to warn every one that the results that you can get in a year are not in any sense conclusive. I do this; and some of you may feel as some of us did that with the poor results of this year it might be regarded as an argument against spraying. There is nothing that we do that we can't get some lesson from.

These photographs that I have here show in all seven or eight stages of the Bitter Rot. Some of them are the tracings from those that we keep in our culture chamber, and show the development from the very earliest stages to the very last stages. I will pass them around first, so that we won't get them mixed.

The second series are what we have called potato apples, because they look more like potatoes than apples. They are the result of our spraying experiments. These are the result of our spraying experiment, and will show you very nicely, and better than any talk I could make, the peculiar effect the Bordeaux mixture had upon the apples this year. I have three or four photographs of them, and a good plat that I am passing around, it is the controlled plat, the one we didn't spray, and will show you the result of the two.

Now, as to the question as to what made that, of course, that is what we are all interested in. We were very careful this year in saying to every one who sprayed to use a certain formula, which had been used in the past; a formula that has been used for a great many years. Five pounds of blue vitrol, five pounds of lime and fifty gallons of water, and I believe that in every respect that formula was carried out strictly.

In June I said something about the care which should be used in making Bordeaux mixture. Now some of these sprayings I know were not made with that care. Some of them dumped in some lime—one of

the men dumped in some lime when I could not be there—simply dumped in enough lime to make what he thought ought to be there. Now, of course, that is a thing that cannot be condemned too strongly. If you are going to make the mixture you have got to do it according to the formula, or not at all, and if a man attempts to do spraying without measuring the different ingredients, and who will say that this barrel holds 35 gallons, when it might hold 40 gallons, will not make a success of the spraying operation.

What happened here is something we could not foretell. I want to say those apples I am passing around were sprayed about ten times. They were sprayed about every three or four weeks, from the very first appearance of the apple until the end of the season; and during the summer, during that tremendous heat, something came, which we could not have foretold, namely, the chemical action which was introduced in that fruit on account of that extreme heat. The chemical action which takes place upon blue stone or anything, was entirely too hard on fruits this summer, and the lesson we can learn from that is to take into consideration the seasons in which we are working. Nothing can be made absolutely according to a formula. You can't harvest the apples on the 15th of September every year. You have to harvest them when the apples are ripe, and the same way you can't apply a cast-iron rule to the spraying or cultivating of anything. You have got to use a little independent judgment in the use of the process. The same will be true with the spraying, and the only trouble with us we didn't know what the relation between heat and spraying was so as to handle it, and the chances are that we will not have a summer like this for many years, and the next year we will spray with the same formula, and I have no doubt the results will be as good in spraying for Bitter Rot and the Scab.

For the sake of those that do spray each year, I will say that Missouri is not the only State. We conducted our experiments in six different states; we tried it in Illinois, in West Virginia, in Virginia and Maryland, but in every one of those states we got potato apples.

As to the variety of fruits attacked, we found that almost without exception the Ben Davis apple was one that was burned the worst, and the Jonathans were burned very little, and the Willow Twig practically not at all, in Illinois, and the same thing held true in Virginia.

Now, that indicated evidently something in the nature of the fruit, which I do not believe has anything to do with the thickness or thinness of the skin. The Ben Davis is a thick skinned apple. There is something evidently in the susceptibility of the Ben Davis that made it more susceptible to this. It is in the variety and the nature of the fruit, consequently you can't blame the Ben Davis apple for it, and you can't blame

yourself for spraying, but simply it was a conjunction of atmospheric conditions and circumstances which brought that about.

Now about the way in which these spores propagate. We have in operation a good many cultures, as I call them, to find out what that Bitter Rot fungus does with itself in the winter time, and we have tried a particular experiment which I hope to report on next June. We built a great glass platform in an orchard over some of the apples lying on the ground, as in this photograph. I want to pass this around to show to what extent the Bitter Rot hurt the apples. We put a glass platform over those about three feet from the ground, and we have sterilized the bottom of that glass, and we are going to examine that every week during the winter time, and we are going to investigate to see if any of these spores fly up in the trees during the winter time.

There can be no doubt that those spores do get up in the trees, and the rains help them, too. I have a photograph which shows the infection after it once gets upon the tree; it starts from one affected apple.

We have a record which was taken upon trees in Virginia, where the rain drops fell on a defective apple, and one could almost trace the direction of the spray of that rain three days later. It showed how those spores had been scattered from that affected specimen over the tree.

The practical orchardist will go around during the summer and remove them. Of course, this is a tremendous piece of work, but as far as the work goes it will pay to do it, even if you only take two apples off of a tree. You are always walking through the orchard, and it is just as easy to take off one or two apples here and there.

I don't want to give any advice about spraying, for I don't feel that I can say anything about it this year. We are going to begin and do the spraying next spring, and we are going to use the same formula, and in one or two orchards use a different formula, simply to demonstrate if there is any difference in it. And we firmly believe that the spray that we used, if it had not been for the circumstances that happened this summer, would have been different. Of course, one thing Mr. Stinson mentioned, that didn't make the experiment successful was on account of the lack of moisture. The spores didn't spread, and in some orchards, I think, there was not ten Bitter Rot apples. And in particular one orchard in Illinois, where the owner came to me in July and said the spray was going to be a howling success, and his prophecy really was true, for in the first place there was not any Bitter Rot, and in the second place no apples in the orchard. But, nevertheless, the disease is so widely scattered that it deserves the attention of everybody, and everybody must do something. You don't want to wake up in the middle of the night and say, I have not done this right, and I will have to do it over again, and

try some other method. The best way is to go over your orchard in the beginning of the year and determine what you want to do, and think about it. I have seen some farmers spray with three or four different solutions, and spend a pile of money, and in the latter part of the year, when there was no Bitter Rot, they feel mad because there was no Bitter Rot. I didn't tell them to use three or four different solutions.

If you keep on spraying, and if you have the heat like we did this summer, you might get burned apples; but I claim that burned apples are better than Bitter Rot any time.

Mr. Baxter of Illinois—Now, I believe that you will find that the Bitter Rot in apples is very similar to the Black Rot in grapes. It begins in a small way by a small speck appearing on the fruit and enlarging by circles. It is the same with the Black Rot in grapes. We have been studying it since 1864, and we have studied it all the time, and at last we found that the Bordeaux mixture would control it, and we have controlled the rot completely. We are not afraid of it at all, and I am satisfied it will be the same way with the Bitter Rot in the apples. Now remember, this is only a preventive. It is not a cure, and if you want to save your apples, just as we save our grapes, you must not wait until the Bitter Rot appears there, but you have got to spray in the beginning. And when is the best to do this? Immediately after your apples or formed. Then it is not necessary to spray again unless the weather conditions are such—if you have heavy rains, such as to wash this off your apples, you want to spray again and keep it up.

Why were these apples scorched this year? Was it because the mixture was too strongly made? No. I know why it was. It was on account of the long dry spell. We have had the same experience with the peach, plum and with the grapes. If you have noticed, when there is a long dry spell and no washing rains afterwards, simply moisture in the shape of dews, why you find this rust. I have noticed it for a number of years. Now, then, I contend that this Bitter Rot cannot develop unless you have moisture. The Black Rot in grapes cannot develop without moisture. Now, the question is, what kind of moisture? It certainly will not develop if you have heavy sweeping rains. The only moisture that will develop it in connection with heat is dew or sprinkles, very light rains, so as to not wash the spores thoroughly. If you have a beating rain it will wash the spores to the ground, and there they remain, and will remain, if the weather comes free of winds; but if the weather afterwards becomes foggy and hot, why these spores will rise again, and will be certain to infect the apple. It will the grapes; it will the plums, or anything else. Now I will venture to stake my reputation on it, that you can't produce Bitter Rot, nor Black Rot, with any amount of heat, provided that

heat is dry, perfectly dry. You have got to have moisture in connection with it, and this moisture must be in the shape of steam, such as fogs or very light dews.

Prof. Johnson of Columbia then described the work they were pursuing in the station and School of Horticulture, and the different courses taught there.

Prof. J. M. Stedman then spoke on legislation against insect pests.

REPORT OF PROF. STEDMAN.

A general meeting of Official Horticultural Inspectors for the United States and Canada was called to order at the Ebbitt House, Washington, D. C., November 11th, 1901, at 7:30 p. m., by the chairman, Mr. S. A. Forbes, of Illinois. Mr. Fernald, of Massachusetts, was chosen secretary.

Those present during the sessions were: Connecticut, W. E. Britton; Delaware, W. Webb; Georgia, W. M. Scott, W. Fiske; Illinois, S. A. Forbes; Indiana, J. Troop; Iowa, H. E. Summers; Maryland, A. L. Quintance; ———, Norton; ———, Blodgett; Massachusetts, H. T. Fernald; Missouri, J. M. Stedman; New Jersey, J. B. Smith; New York, G. G. Atwood; North Carolina, F. Sherman; Ohio, F. M. Webster; Pennsylvania, J. Hamilton, E. B. Engle; Virginia, W. B. Alwood, J. L. Phillips; Wisconsin, W. A. Henry. W. G. Johnson and E. D. Sanderson were also present at a part of the meetings as visitors.

On the motion of Mr. Alwood, of Virginia, it was voted that a committee of three be appointed by the chair to report as soon as possible on the advisability of forming a permanent organization. The president appointed Messrs. Smith, Webster and Summers.

On the motion of Mr. Smith, of New Jersey, the question, within what limits of time may nurseries properly be inspected, and what period should the annual certificate be made to cover? was taken up. After much discussion, it was voted on the motion of Mr. Smith, of New Jersey, that the resolution adopted by the meeting of Horticultural Inspectors in Chicago on January 4th, 1901, bearing on this point be adopted by the Society, as follows: "That the period of inspection should be determined in each state at the discretion of the inspector, but it was agreed that all peach stock should be inspected as late in the season as practicable, particularly where the surroundings were such as to cause suspicion of the occurrence of the San Jose scale, or where the origin of the buds was either suspicious or unknown. In such cases, if the nursery was inspected early, a late supplemental inspection of the peach stock should be made."

On the motion of Mr. Alwood, of Virginia, it was voted to be the sense of this conference that a certificate ought not to extend beyond the commencement of the breeding period of the San Jose scale. On the motion of Mr. Webster, of Ohio, the question was taken up and discussed, and was still under consideration when the meeting adjourned till November 12th, at 9 a. m.

November 12, 9 a. m. The meeting was called to order by the chairman. The reading of the minutes was omitted. Mr. Hamilton, of Pennsylvania, offered the following resolution, which was adopted: "In order to arrive at a common understanding as to the best insecticides to use for the destruction of the San Jose scale in the orchards and nurseries of this country, and in order to secure definite directions for their application, a committee, consisting of Messrs. Smith, of New Jersey; Webster, of Ohio; Fernald, of Massachusetts; Alwood, of Virginia, and Atwood, of New York, is hereby appointed to prepare a recommendation to be submitted to this Association for its consideration."

On the motion of Mr. Fernald, of Massachusetts, the question, what nursery pests should be regarded as dangerous enough to influence or prevent the granting of a certificate? was taken up. After considerable discussion, it was voted on the motion of Mr. Alwood, of Virginia, "that each official inspector submit a list of those insects and diseases which he thinks should always bar nursery stock from receiving an official certificate, and a secondary list of insects and diseases of less importance with terse statements of how he deals with them."

It was voted on the motion of Mr. Alwood, of Virginia, that when this meeting adjourns, it adjourn to meet in joint session with the entomological section of the general Association at 2 o'clock this afternoon, and that a farther session be held at 7 p. m.

The question of the legal right of inspectors to enter private property and enforce treatment against the wishes of the owners was then discussed.

The tendency of the discussion participated in by Messrs. Atwood, of New York; Smith, of New Jersey; Alwood, of Virginia, and Hamilton, of Pennsylvania, was to the conclusion that in those states at least it would be illegal to force entry and destroy property without due process of law; and law giving such power to any individual would be unconstitutional. The topic "what should be the common policy of State inspectors with reference to stock officially inspected and certified in other states?" was taken up and was under discussion when the Association adjourned.

November 12, 7:15 p. m. Meeting called to order by the chairman. Committee on Advisability of Permanent Organization reported a recom-

mendation that a permanent organization be not formed, but that another meeting be held in connection with the next meeting of the A. A. A. C. E. S., and this report was adopted.

On the motion of Mr. Summers, of Iowa, it was voted that when this meeting adjourns, it adjourn till 9 a. m., November 13th, and that the first order of business be the selection of a chairman for the next year. The report of the committee on the resolution offered by Mr. Hamilton, of Pennsylvania, was made as follows: "The committee, after due consideration, finds itself able to agree upon the following recommendations for treatment: 1. For Nurseries—Proper fumigation with hydrocyanic acid gas after inspection.

2. For Orchards—Late summer and fall treatment with dilute solutions of insecticide soaps, oils or other effective insecticides, to kill young scales. Winter treatment with insecticide soaps, or oils sufficiently strong to kill the scale, and which have been proven safe to trees of all kinds in the region where the application is to be made.

(Signed)

JOHN B. SMITH,

Chairman.

F. H. WEBSTER,

H. T. FERNALD,

WM. B. ALWOOD,

GEO. T. ATWOOD.

The report of the committee was adopted.

Farther discussion of the 4th topic was laid upon the table till the next session.

On the motion of Mr. Smith, of New Jersey, the topic, "What should be the procedure, or form of certificate, in case some part of a nursery is affected by a dangerous fungous or insect pest not of a kind to involve other parts not so effected?" was taken up for consideration. It was voted on the motion of Mr. Summers, of Iowa, that it is the sense of this body that but one form of certificate be used as a rule, so worded as to be applicable to stock sold from nurseries after some portions have been thrown out as not included in the certificate. The topic, "What should be the usual form of the certificate?" was then considered at length. On the motion of Mr. Smith, of New Jersey, it was voted that it is the sense of this meeting that every certificate should specify the date of the completion of the inspection. On the motion of Mr. Summers, it was voted that it is the sense of this meeting that the certificate should be worded in the impersonal form. On the motion of Mr. Smith, of New Jersey, it was voted as the sense of the meeting that no insect or fungous should be

specifically named in the certificate, but that that portion should read "free from dangerously injurious insects and diseases, etc."

The Secretary stated that he would prepare and send copies of the record of these meetings to all of those present who desired to receive them.

The meeting then adjourned.

November 13, 1901. The meeting was called to order by the chairman. The minutes of the previous meeting were read, corrected and approved.

On the motion of Mr. Summers, of Iowa, Dr. S. A. Forbes, of Illinois, was unanimously chosen as chairman of this body for the next meeting, to be held in the fall of 1902.

The topic, "Is national legislation covering nursery inspection desirable and practicable?" was then discussed. On the motion of Mr. Alwood, of Virginia, it was "resolved that it is the sense of this body that the bill for providing for national control of inter-state commerce in nursery stock which has been frequently endorsed by entomologists, nurserymen and orchardists and favorably reported in both branches of Congress, should be enacted into a law."

"May provision be made for the publication of a practical article on the principal nursery pests of the country, available for all Horticultural inspectors and distributed to all nurserymen and others immediately interested?" was next taken up. It was voted on the motion of Mr. Smith, of New Jersey, that the United States Department of Agriculture be asked to publish such a document.

The topic, "How wide an application should be given to the term nursery stock? Should it include herbaceous plants grown out of doors? Should it ever cover greenhouse stock?" was next considered. On the motion of Mr. Summers, of Iowa, it was voted that it is the sense of this body that strawberry plants should be regarded as nursery stock and included. It was also voted that grape cuttings be included as a part of stock necessary to inspect.

On the motion of Mr. Scott, of Georgia, it was voted that general ornamental stock grown out of doors be included in all inspections.

The topic, "What measures should be taken by Horticultural inspectors for the regulation of the business of dealers, not owners of nursery premises, nor growing their own stock for sale?" was then discussed and the present practice in a number of states was explained, but no action was taken on the matter.

It was voted on the motion of Mr. Scott, of Georgia, that when the meeting adjourns, it adjourns to meet not as Horticultural inspectors, but

with the Entomological Division of the American Association of Agricultural Colleges and Experiment Stations.

The topic, "What is a sound public policy with respect to the division between the State and the property owner of the costs of a practical operation for the control of Horticultural pests?" was then discussed. On the motion of Mr. Scott, of Georgia, it was voted that it is the sense of this body that in all cases where the state makes any provision for the inspection of nurseries these inspections should be conducted absolutely without cost to the nurserymen.

The meeting then finally adjourned.

H. T. FERNALD,
Secretary.

PEACHES IN SOUTH MISSOURI.

(By G. W. Hopkins, Springfield, Mo.)

I have not prepared any paper on this subject. In my younger days I sometimes liked to indulge in these things, in these affairs on paper, but as I get older I try to be more particular.

I am going to give you a little talk now, and if anybody wants to ask questions I will answer them if I can, and if not, perhaps somebody else will be able to do so. You all know that after the severe winter of 1898 and 1899 the peach trees in South Missouri, as well as in other places, were very badly injured. They were sick, and the question arose, what shall we do with them. Several plans were proposed, and the most of them were adopted, although they were different. One plan was to cut down the trees from eight to twelve inches from the ground, or to the snow line, whatever that might be. A great many trees were cut down—whole orchards of them. Those trees, I believe, so far as I have been able to find out, have never done any good. The most of them died. Some put out a little sickly growth and died afterwards. Another plan was to cut back the main limbs, from two and one-half to three feet. A great many adopted that plan. I did so, although I am not growing peaches to any great extent, and so far as I know from my observations and what I have learned that plan was pretty successful. They made a good growth of young wood, and this year, so far as I know, in our own section of country, those trees produced the best fruit we had.

Now, there was another class that didn't do anything with the trees. They just let them go, and they made a very weak, sickly growth.

They made no new wood hardly at all, and that class of trees, a great majority of them, died. The limbs broke off—a great majority of them did, but there are exceptions here. I know of one orchard that was let grow in that shape. There was never anything done with it. There had not been a plow in it for two years before, nor there has never been anything since. It had grown up in weeds and briars and bushes, and I must say that the largest and finest and the most highly colored peaches I saw in Greene county came out of that orchard. But there is another side to it. That orchard is now dead. I would not give twenty-five cents for it to produce peaches another year. It has exhausted itself in maturing the crop of fruit that was set this season. It will never produce anything more. If it was mine, I would cut it down.

Now, this has been a remarkable year in many respects along that line. There are many such things have occurred, both in peaches and in apples, and so we are left somewhat in doubt as to what course is best to pursue in regard to cultivation. Now, there have been peach orchards that were thoroughly cultivated. I know of one, a young orchard, about two miles from mine. The trees were only four years old. It was planted in pop corn, and cultivated just the same as if you were raising a crop of corn or any other field crop. The trees made a fine growth, and they kept growing and growing, and the peaches kept growing, and they liked to have never ripened. They didn't get ripe in time to go off in the cars for shipment. That is one point against this continuous late cultivation. Now we have the extremes. There was fine fruit in that orchard, even if it didn't get ripe in time, and we have those old orchards that did get ripe in time and had fine fruit, but now the trees are gone. This other orchard is in fine condition for another crop.

Now on this subject of cultivation. I believe that there is danger of running to the other extreme. You talk too much about your intense cultivation. Mr. President, I believe in cultivation, but I believe there is a limit to it. I do not believe a peach orchard should be cultivated to any extent after the first of June. You want to give your peaches time to ripen, and if you keep cultivating, you keep up a growth of wood, and your peaches are long in getting ripe, and you never get the color to them. I do not believe it is necessary in a peach orchard to keep up the cultivation so late. I think there are some mistakes being made along that line.

I suppose the peach crop in South Missouri the present year is the largest that was ever grown. Now, of course, some of the old orchards may have had just as many on them before, but then the average is so much larger, that I will state that it was the largest crop that was ever

grown in South Missouri. I do not know much about the prices that were realized in the district below me where they grow them more extensively. I do not know whether in all sections there they realized good prices or not. I know that in Greene county, where we are not growing them to any great extent, we only shipped four carloads, but the home market was good. There were no good peaches sold for less than a dollar a bushel. At least I sold none. There was no necessity for selling them for a less price. There was a prominent grower of Howell county that made a statement before our Society that they were growing too many Elbertas south; that there was a time when all of the prominent markets were glutted with Elbertas. Now, I don't know whether that was true or not, because we didn't ship any off in the direction that they did, but I am one that does believe that there can be an overproduction of perishable fruit. The time was when they said you could not get too many strawberries; the more you planted, the better. Some of you have seen to your sorrow that that was something that was not true, and the peach is but little better than a strawberry. Men are running wild, because they have had a good crop and good prices. Every man says: I am going to set out so many peach trees if I can get the stock. They are just going to crowd every acre into peaches; but just as sure as they do it, and keep setting out one variety, the Elberta, they are going to have the markets glutted, just the same as you did with strawberries. You may call me an over-production crank, but that is all right.

Now with apples it is entirely different. That is something you can hold. You can hold them until you get a market. It does not make any difference how much of a crop you raise.

Now, Mr. President, I am not going to take up any more of your time. I have spread this thing out before you, and there are men from further south in Missouri. There is Mr. Speakman and others engaged in it more extensively than I am, and know more about it, and can tell you more about it than I can.

PEACH DISEASES AND THEIR TREATMENT.

(By Wm. B. Hoag, Columbia, Mo.)

To be called upon to talk on a subject that embraces as much as this does, makes one feel at a loss to know where to begin and end. As culture is intensified, factors before unknown are brought to the front. The trite observation that there is scarcely a limit to the number of new diseases has some foundation in experience. New

diseases appear from time to time in addition to the old diseases that have been known in different parts of the United States ever since peach culture was begun. With simple gathering of the fruit crop and no further attention until the next is ready to pick, the diseases, like the crops, are a matter, of course. They express nature's supposed method of growing these things. But man is an active agent in the procedure. He introduces other conditions than the natural ones, and by importation of stocks, etc., scatters the diseases or insects found in centers of older culture to the newest and remotest portions of the earth. Man has learned likewise to be a factor of another sort. He has devised methods of prevention, which are very much needed to maintain an equilibrium of forces.

PEACH YELLOWS.

The yellows is an American disease, which has been known for about one hundred years. It attacks almond, apricot and nectarine trees as well as the peach, and has been recorded upon Japanese plum trees.

In the United States, Yellows is found in all the states east of the Mississippi and north of the northern boundaries of Tennessee and North Carolina, excepting Wisconsin and possibly some of the northern New England states. It has not been found in the southern states.

As yet, the specific cause of Yellows is unknown. The symptoms are: First, premature ripening of the fruit, which is highly colored and spotted, and has the flesh marbled with red; second, premature opening of winter buds. This may extend to fruit buds as well as leaf buds, and has been observed as early as June and as late as November; third, new buds develop on the trunk and branches and grow into sickly looking shoots.

The fruit may ripen as much as six weeks earlier than the normal period, and oblique slices from the colored side will show the red marbling of the flesh. The quality of the fruit is affected, being insipid or mawkish. The symptoms may occur upon a single branch, but when only a small portion of a tree shows the symptoms, the whole tree is hopelessly diseased, and should be treated as any other tree that shows further development. Free blooming of yellows trees may occur as late as November, though it is less frequent than the unfolding of leaf buds in autumn.

The branches from prematurely developed buds show many characteristic forms of growth. The primary shoots may branch again and again, to produce a broom growth of slender wiry twigs. A general yellow color of the leaves is not a characteristic symptom of yellows, but indicates more commonly some lack of vigor in the tree. In sandy soils

especially trees transplanted two or three years old often make very slight growth and develop very slender branches. The leaves, however, are more nearly normal, and there is no premature growth. With trees showing these characteristics it is well to examine the roots for Root Aphid, or other troubles.

Yellows is supposed to be contagious. Dr. E. F. Smith thinks that it is a physiological disease, somewhat analogous to variegation in plants. While no specific germ of the disease has been discovered, it is unquestionably spread by means of bud inoculation and by proximity of affected trees. While the cause is yet undetermined, the manner of spreading is for practical purposes demonstrated. If yellows trees are permitted to remain in a district the disease spreads to other trees, though not necessarily to the adjacent ones first. In many instances the secondary cases are scattered irregularly about in the orchard. Not only is there danger from the living trees, but also from those cut down. Cases are cited where Yellows was spread by dragging uprooted diseased trees through the orchard. Safety is therefore not attained by merely cutting and piling the yellows trees. As yet no cure has ever been discovered for Yellows. Experiments with fertilizers to cure Yellows have proven of no avail. The only known remedy is the immediate complete destruction of all affected trees by burning.

ROSETTE.

Rosette occurs in Georgia, and in parts of South Carolina, Missouri and Kansas. This disease is similar in certain respects to Yellows, but unlike it has a shorter course and somewhat different symptoms. Like Yellows, the symptoms may appear first on part of the tree, when the whole tree is diseased. The symptoms generally appear in the spring, and the trees always die the following fall or winter. In trees affected with Rosette, the leaf buds all grow into compact tufts or Rosettes, and these Rosettes, although only two or three inches long, often contain several hundred leaves. The older leaves at the base of the tufts are often quite long, but have long inrolled margins and a peculiar stiff appearance. They turn yellow and drop in early summer, while the inner leaves are yet green. As in Yellows, the only remedy found is the complete destruction of all affected trees by burning.

TWIG DISEASE WITH GUM FLOW.

Within the last few years another new disease has made its appearance, commonly known as "Twig Disease," "Gum Flow," "Gummosis," etc. Briefly, the symptoms of this disease may be stated as the exuda-

tion of gum upon the twigs, branches, and even upon the trunks of the trees. There are no perforations of the bark as are made by the Bark Beetle. The gum hardens and becomes conspicuous. The disease appears at all seasons of the year, but is most manifest when the leaves are off the trees. In general, the exudation occurs near the leaf scars of the previous year. Following the continued exudation of gum, enlargements form at many of the affected points. These enlargements are often great enough to be mistaken for Black Knot. Sectional examination of the diseased branches generally shows a dead or injured area. In the region of the dead or injured area we find gum pockets, and they continue apparently while growth lasts.

The real cause has not been discovered. When a tree is badly affected by this disease, it is probably best to destroy it by burning. Where orchards are slightly affected, it may be worth the while to try close pruning, drainage, if necessary, and thorough cultivation.

TWIG SPOT—BROWNING OF GREEN BARK.

In uncultivated orchards spotting of the twigs is frequent. Many specimens show definite spots in which the epidermis has turned down, resembling Anthracnose spots on the raspberry. Such spotting is very general. No fungus or other organism has been found to occur constantly in the spots, and the practice of cultivation and good care causes much of it to disappear. A normal cork growth, however, should not be mistaken for fungus or for a diseased condition.

CROWN GALL.

This disease manifests itself in enlargements upon the roots and stems of the tree, but with a decided tendency to occur at the crown of the tree. These galls are usually soft, corky or spongy growth upon the various parts of the tree. Below ground the galls are renewed with each season's growth, the old galls falling away and decaying while new ones are formed. When new, the galls are externally of the same color as healthy roots. This formation of galls continues until the death of the tree, which usually occurs in from one to three years.

Excision of these galls seems to have no influence whatever in the way of eradicating the trouble. No matter whether but a single gall appears upon a small root, or large ones upon the main stem, the whole tree seems to be in a diseased condition, and as the old galls are taken off, new ones appear. The disease appears to be communicable over short distances in the soil, and the soil will remain infected for some time after the removal of the diseased trees.

It is somewhat difficult to study the cause of this disease, due to the fact that the trouble is all beneath the soil. As yet, nothing definite has been discovered in regard to it. Dr. Smith thinks that it is due to some external parasite, while Halsted suggests a fungus origin.

Trees affected by this disease at transplanting age, seldom, if ever, come to successful fruiting, and by far the greater number of them may be expected to die before they have attained bearing size and age.

So far, all experiments to cure the disease have failed. Favorable results from injecting Bordeaux mixture into the galls have been reported in California, but practical measures must be chiefly preventive, and the most important of these will be the rejection of affected nursery stock.

PEACH ROT.

While the fungus diseases of the peach do not rank with those of the plum in destructiveness, several of them are quite damaging. The belief that peaches rot solely because of the weather is often expressed; but while, to be sure, the weather influences the amount of rot, it is only a condition and not a cause of peach rot. This is truly a fungus disease, due to the rot fungus (*Monilia frustigena Pers.*) The weather simply influences the amount of rot by offering favorable or unfavorable conditions of heat and moisture. This rot fungus, as most fungi, has its growth favored by warm weather and abundant moisture, so that if these conditions come together near ripening time, we may expect serious loss of fruit. It is no unusual thing to see a large number of brown rotten peaches on the trees, with a great abundance of ash-colored spores produced upon the surfaces. These powdery masses of spores are easily scattered by the wind and rain and will cause any amount of mischief where they find a suitable place. Favorable places are numerous, such as in a dense cluster of fruit, or where the fruit is densely shaded by leaves; and, in case of warm, showery weather at times of blossoming, the spores may enter through the blossoms and cause serious damage in the form of twig blight. It may be a matter of surprise to some to hear that this rot fungus destroys the twigs and blossoms as well as the fruit. We are accustomed to see much rot among the early varieties, like Hale, Alexander and others, and are consequently apt to call these susceptible varieties. However, a large amount of rot in any variety may be expected during warm, wet weather at ripening time, and there seems no reason to regard early varieties, on the whole, as more susceptible than late varieties.

The rot fungus survives the winter in the mummy peaches, also in mummy plums and cherries, as the same fungus is found in all stone fruits. To what extent it may survive in the twigs can not be stated. All that is needed to induce its growth is a period of warm, rainy weather. All rotted peaches therefore should be removed as soon as they appear, and especially before the warm spring rains. The rot may be checked in great measure by judicious spraying with Bordeaux mixture. Of course it should be remembered that peach foliage is peculiarly sensitive to fungicides and great care should be used in spraying. The first spraying should be given during late winter just before the fruit buds begin to swell, using a mixture of normal strength. When the fruit is about the size of a hazelnut, the second spraying may be given, diluting the formula one-half, and that may be followed by a third spraying two weeks later, using 125 gallons of water to four pounds of copper sulphate and five pounds of lime.

PEACH SCAB.

In peach scab we have a disease that is sometimes mistaken for a peculiarity of certain varieties of peaches. The dark spotting and cracking of the fruit is really a disease caused by a parasitic plant, the scab fungus, (*Cladosporium carpophilum*, Thm). It is much worse during rainy seasons than in dry seasons, moisture seeming to be the chief requirement. Certain varieties seem to be more susceptible than others. The scab produces a hardening of the fruit beneath the scabby areas, and in severe cases of scab, the affected side cracks open. The fungus is found on the branches where it passes the winter, and occurs continuously upon the same tree. From this we know where to expect it.

Experiments seem to show that persistent spraying with weak Bordeaux mixture will greatly reduce the amount of scab.

BROWN OR PUSTULAR SPOT.

This is comparatively a new disease. Prof. Taft says it is caused by the fungus (*Helm in thasporium carpophilum*, Lev.) It first appears as small rusty brown spots upon the upper or exposed side of the peaches as early as June 1st. After the fruit droops, the spots are usually turned towards the observer. They increase in size and develop light-brown centers, but are not otherwise conspicuous until the fruit begins to ripen. From ripening time forward, there is quite a variation in the development of the disease on different varieties of peaches.

The fungus of this disease is superficial in its development and

therefore easily reached by spraying. There is no other disease that seems to yield more readily to fungicides than this.

LEAF-CURL.

It is well known that the leaves do an important work for the plant. Any disease, therefore, that seriously interferes with the functional activity of the leaves, will prove detrimental to the health of the plant. Such a disease is caused by the leaf-curl fungus, (*Eroasca deformans*, *Fuckel*) which attacks both leaves and young shoots. This disease is too well known to require any description.

The masses of hyphae pass the late summer, fall, and winter, in the tissues of the leaf buds, that is, the mycelium is perennial in the buds. With the beginning of spring growth in the tree there is growth of the fungus as well, the new leaves and shoots being affected as they are put forth. The amount of the infection determines the extent of the subsequent distortion. It is evident that the fungicide can not reach the leaves before emergence from the bud, and except in cases of treatment year after year, we can not expect that the first leaves upon treated and untreated trees will show any great difference in the proportions affected by the fungus. But we may rightfully expect treatment during a given season to reduce the amount of surviving fungus mycelium in the leaf buds. This effect will not be manifest until the following year. The more immediate results to be expected from spraying are much of the same nature; they can not be expected upon the earliest leaves, but the spraying may, and does, prevent the infection of the succeeding leaves and shoots. By this we see that thorough spraying the preceding year is even more effective in the prevention of leaf-curl than during the season of its occurrence.

The first spraying should be given of full strength Bordeaux mixture just before the blossoms open, or even earlier; and the second one of half strength mixture, just after the calyx drops from the fruit.

Columbia, Mo., Nov. 8, 1901.

Prof. Whitten is now in the University at Halle, Germany. He describes a visit to one of the largest commercial orchards and nurseries in Germany. "The proprietor was not at home, but the head gardener took us around and when we came to the peaches he explained that they could not grow many peaches there except trained to walls and covered in winter for the buds often winterkill. But now, he said with great gusto, we have discovered a method of winter protection which enables us to carry this big, young orchard out here in the open through the winter without injury. He then explained how

it was necessary to hold the buds dormant, and said they simply whitened the trees by spraying with a thick chalk solution, which remained frozen on all winter and kept the buds dormant all the time, so that for two winters they had brought them through safe when uncovered trees failed. He said Prof. Muller of the University suggested the work to them and that it not only held the buds dormant on warm days but that it prevented leaf curl, which is a universal scourge here. He also remarked that he had heard that this method was being adopted in America for the same purposes with good results. He knew much more than I did about the practical results of it being so widespread, so I simply listened attentively to what he had to say of its practical utility and didn't tell I had ever heard of it before. He also added one thing I was greatly interested in, and that was the statement that they had found all of their lighter twigged sorts came safely through the winters oftener, while the purple ones were tenderest of all; that they did not understand this till the principle resulting in the whitening was discovered by them." Prof. Whitten remarked that the work done on whitening here was before they began its use there, so that I have no doubt but what they got the idea from his bulletin on the subject. Very truly yours,

W. L. HOWARD.

Discussion.

A Question: I would like to inquire what is the latest peach that we have?

Sec. Goodman: I think that I can answer that question. Billue's Late October or Henrietta.

Mr. Hopkins: The Bonanza was later with me this year.

A Question: Does the peach yellow ever show itself in the year old trees, or in the nursery, or is it not a disease that requires age to produce?

Prof. Johnson: No, sir; usually shows in trees after they become of some size.

A Question: I want to know whether it pays to spray for this rot?

Prof. Howard: Since I have been connected with the Station we have not conducted any experiments in spraying peach trees, that is scientific experiments, but we have no doubt that those rots can be largely controlled by judicious use of Bordeaux mixture. The ammoniacal or carbonate solution is best for fruit trees because it does not injure the foliage.

Mr. Baxter: I have tried it and used it for a number of years and it paid.

A Question: I should like to ask the gentleman what his formula was for that spray.

Mr. Baxter: Two pounds of sulphate of copper, and four pounds of stone lime and fifty gallons of water. You have got to be very careful not to scorch the leaves.

A Question: Has the peach yellow over been known to exist in the State of Missouri?

Prof. Hoag: I believe it has; I have heard of it, but I have never seen it.

Mr. Dix: I can say I have had it for ten years. I control it by cutting it out.

Major Holsinger: I sometimes think we confuse the two diseases, the Yellows with the rust. I have seen some diseases that have been pronounced, Yellows which I am satisfied was not the Yellows.

Prof. Howard: I wish to know if any one is familiar with the Dwarf Japan Peach?

Sec. Goodman: What use is it in Missouri?

Prof. Howard: We have one tree, and if it keeps up every year as it has this year, I think it is going to be very valuable.

Mr. Augustine: Can the Yellows be disseminated by the planting of pits from infected trees?

Major Holsinger: It is an impossibility, I say.

President Murray: Some one asked for five varieties of peaches.

Sec. Goodman: First, Mountain Rose; second, Crawford; third, Champion; fourth, Elberta; fifth, Salway.

Pres. Murray: Give us five peaches for North Missouri.

Sec. Goodman: I would take, first, Champion; second, Elberta, and third, Crosby; fourth, Mountain Rose, and fifth, Salway.

A Question: On what ground does Prof. Evans say there is no such peach as the Elberta Cling?

Mr. Evans: I have never seen an Elberta Cling, and I never have heard of one until I came here.

Mr. Wilson of Buchanan County: I would say that Stark's has advertised the Elberta Cling; it is on their list this year.

Mr. Tippin: I think that is pretty good evidence there is no such peach.

A Question: I would like to have a peach earlier than the Elberta, and one later.

Pres. Murray: Mr. Goodman gave the Mountain Rose, that is earlier, and the Salway that is later.

Mr. Tippin: I will answer the question. For three peaches I would say the Champion, Elberta and Emma.

Mr. Evans: I have been asked orally and by letter a number of times within the last few months a question, and if that question is answered it will probably satisfy other people. I have been asked the question, what is a nectarine?

Judge Wellhouse: A smooth peach.

Mr. Evans: What is the origin of a nectarine, or is there any such thing as a nectarine originating from anything else but a peach seed?

Mr. Murray: I have known the nectarine to originate in our county from peach pits, but I never knew nectarine to originate from anything else.

Mr. Jenkins: I wish to say I have a peach on the table that ripens at the same time identically with the Salway, and looks exactly like it, but a cling. I want to know what it is. It is a yellow peach.

Major Holsinger: I have 49 seedling Salways growing from pure Salway seed on the Olden farm. Nine of these Salways are clings, and I presume that is what yours is.

Question: Would you advise pruning Dewberries, and what length?

F. H. Speakman: Dewberries for best results should be cut back to 2½ feet on very strong canes and 1½ feet on weak ones. This pruning should be done late in winter or very early in spring—before growth starts.

Question: What is the leading commercial winter apple today in Missouri?

Answer: Ben Davis.

Question: What should be done with water-sprouts, where they are very thick in an apple orchard that has been neglected for two or three years?

Secretary: If the trees are old it is best to leave most of the water-sprouts to help the tree renew.

ORCHARD LANDS OF THE STATE.

(By Edw. S. Butt, Mayview, Mo.)

It can hardly be expected of a general and stay-at-home farmer and orchard man to treat this subject exhaustively. In fact, it seems to me it ought to be discussed by representatives from all parts of the

State and thus secure in one report a collection of the known facts upon this primary or fundamental step in orcharding. The book would furnish to the inquirer the knowledge of where he could obtain the foundation upon which to erect his Horticultural structure. In all lines of husbandry we often plant in wrong kind of soil for best success. If there are sections of the State especially good for apple growing we ought to know where they are and also be willing for the balance of mankind to know it. Hence the need of some one report containing all the facts. This State, great in many lines of production, will be in a few years the banner apple State of the Union. Centrally located in the Mississippi valley, with the alluvial soils of her great rivers, and the semi-mountainous lands of the south, the State cannot be surpassed for her acres of apple lands. We read of the apple belt of Eastern Kansas, of Southern Iowa, Southern Illinois, and Northern Arkansas. Men talk and write of the great fruit belt of Michigan and the apple district of New York, but we grow apples from Arkansas to Iowa and from Kansas to Illinois. The area of commercial growing is constantly enlarging. A year or two ago, one of our number goes into the southeast and discovers a garden spot, the possibilities of which no one can foretell. Some of the high prairie lands are not the best for apples, yet the home without an orchard is an exception, and where apples can be grown for family use they can be grown for market. We have some spots too wet for orchards and some too rich for fruitage, yet the State from boundary to boundary certainly cannot be excelled for her available orchard lands.

Remember, the Father of Waters washes the eastern border, the Big Muddy the northwest and cuts the State into halves, thus furnishing acres of alluvial soil, dry, deep and rich, and the strong clay lands of the timbered sections all over the State will place Missouri at the head of the list of all commercial growing states.

Having written of orchard lands of the State in a general way, I wish in closing, to call your attention to some of the advantages of my own county. No special effort has ever been made to herald abroad the adaptability of our soil and climate for orcharding. No railroads carry prospectors at half rates or no rates, neither have they or landed companies flooded the country with hand-bills telling of her wonderful resources as an apple country, yet we are planting trees by the thousands and producing apples by the train loads. Situated on the Missouri river, forty miles from the cellars of Kansas City, with her high, dry, melloy soil that characterizes hemp lands wherever found, Lafayette is destined to become one of the first counties in the State in the growing of apples.

If there is one here who contemplates embarking in commercial orcharding I invite you to investigate this county. Visit us in May and we will ascend the mounds upon and around which our village is builded, and view the landscape for miles and miles and you will not wonder that we called our town "Mayview." The man in the north-west will talk to you, perhaps for hours, about the wonderful formation of his soil—no rock, no hardpan—roots of the trees go down and down, and water comes up and up, yet in this year 1901, while we wished and waited for rain, and would have rejoiced to have had more moisture from either up or down, the few sprinkles we had matured as fine apples as ever went into barrels. Let the Ozark man use the stoneboat ax and grubbing hoe, let him work half the year to conserve moisture, the other half growing cowpeas and scattering train loads of fertilizer, let him rack his brains and lose his sleep over Root Rot, Woolly Aphis and Bitter Rot, you come to the hemp lands around Mayview. Plant your trees, and while they grow, raise big crops of corn to feed to pigs, sow to clover and fatten calves, and then fill the barrels with as fine Bens as were ever reddened by October frosts.

SUCCESSFUL PLUM GROWING.

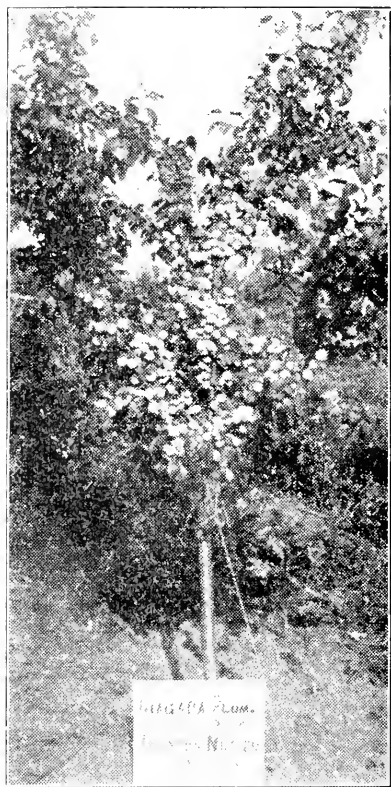
(By E. L. Mason, Trenton, Mo.)

There are so many important points, connected with successful plum growing, that it will be impossible to treat the subject thoroughly, in a short paper. Besides, plum growing on a large scale, is comparatively a new industry, in North Missouri, especially in Grundy county. Still more, the great interest taken by Luther Burbank and others in creating new varieties, has made a large list of new plums, of which many are very promising, and when fully tested may prove superior to the leading varieties of the present time. So just what will be planted in plum orchards in the near future is an unsettled question.

The experience concerning the hardiness of plums the winter of '98 and '99 has made us somewhat cautious about what we plant. So in planting a plum orchard for the best results, it seems best not to place too much dependence on kinds that are not entirely hardy. The Japan and Domestic varieties have not shown sufficient hardiness in many cases for severe winters, especially the winter of '98 and '99. So it would seem a safer plan to plant a good proportion of the best native varieties along with choice Japan and domestic kinds, and thereby partially insure the orchard against a total failure from severe cold or

late frosts. Another point to be considered is, that native plums are not subject to rot, while Japan and Domestic plums require more or less attention in this respect.

In the vicinity of Grundy county more native and Japan varieties



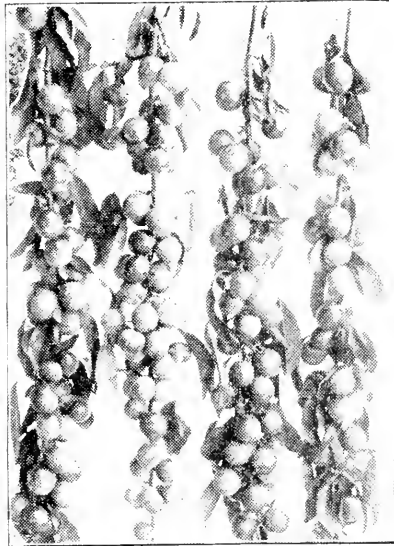
are planted, though Domestic kinds are grown and make a fair yield of perfect fruit. Green Gage, Lombard, Niagara, Shipper's Pride and Damsons, have done very well the past two seasons. Of this number, the Niagara seems to be the most prolific. Abundance, Burbank and Wickson at present make up the Japan list. Burbank is the favorite on account of early and abundant bearing and large handsome fruit. The native kinds are largely Wild Goose, and Poole's Pride, and probably Poole's Pride produces as many bushels of plums as all the others combined.

Pollination.—Successful plum growing is largely dependent upon the mixing of varieties that will pollinate each other. The

subject is of much importance and should receive more attention than space will permit in this paper. I will take the liberty to quote two essential points from Prof. F. A. Waugh's able work on "Plums, and Plum Culture." "Plums should always be planted on the assumption that they will require cross pollination." Again, "If two varieties do not blossom at the same time they can not pollinate one another." The work contains a pollenizing chart, giving names of varieties, the group they belong to, and the kinds recommended as pollenizers. Thus giving the planter valuable aid towards arranging the orchard for successful plum bearing.

Cultivation.—Prof. Waugh says, "The plum orchard should have the same cultivation as the apple orchard. Horticulturists are thoroughly agreed on this point. They are practically agreed also that this means a general plowing in the spring with a clean surface culture till the middle of July, or the first of August, and a cover crop for fall.

The spring plowing should be given as soon as the ground can be worked to advantage and though it need not be deep, should be as thorough as the conditions will permit." Experience with plums during the past hot dry weather showed very clearly the advantage of cultivation. Cultivated trees made a fair growth and plums were nearly the usual size of more favorable seasons, while uncultivated trees made very little growth and often the plums were shriveled, and largely worthless. Successful plum growing is largely dependent upon the thoroughness of the orchardist in destroying various insect pests that attack the plums. Spraying and what poultry has done, so far, have secured me a good yield of perfect plums. Perhaps I should add that I have practiced picking up fallen plums before the larva made its escape into the ground and put them in a box where the poultry could destroy the larva. This no doubt checks the work of the curculio considerably, but in growing plums on a large scale, jaring the trees, and the curculio catcher will become a necessity.



POOLES PRIDE.

Japan and Domestic varieties that I am growing have not yet been attacked to any great extent with plum rot. I am inclined to believe that much can be done towards holding the disease in check by removing all diseased plums soon as discovered and burning them; but a more certain remedy would be to spray thoroughly before the buds start in the spring with a strong Bordeaux mixture, or a pure vitrol solution.

The distance to plant plum trees is perhaps an unsettled question. Strong spreading kinds seem to require more room than those of a more upright growth. I am planting strong growing native varieties 16x16 feet, and Japan and Domestic kinds 12x16 feet. This will not give any more room than required for spraying and the use of the curculio catcher. Thinning fruit of varieties inclined to overbear certainly comes under the head of successful plum growing and is the part that is much neglected. I quote again from Prof. Waugh's able work, *Plums and Plum Culture*. "Thinning is important with many kinds

of fruit, but with none more than with plums. Many varieties, particularly of the Japan and American classes, have a great tendency to overbear. They will set twice or ten times as much fruit as they ought to mature, and do it year after year. Burbank, De Soto and Lombard may be mentioned as examples. The overbearing tends to weaken the trees. In fact, hundreds of trees are killed by it. At the same time it makes the current crops small of fruit and less valuable on the market. One bushel of fine large fruit is worth three bushels of sour, undersized plums, and it is much easier for the tree to produce it. Thinning is a well recognized practice among the best growers." "Plums should be thinned immediately after the June drop."

With proper attention, it is a settled question that plums can be grown in North Missouri, and while native varieties show more hardness, with better treatment choice Japan and Domestic varieties can be successfully grown. They will require good soil, good natural drainage, good cultivation, and especially a cover crop of rye or oats to check late growth and for winter protection. There should be thoroughness in spraying against rot and insect pests. In short, thoroughness in everything that pertains to plum growing and making it a success.

Trenton, Mo., Dec. 31st, 1901.

L. A. Goodman, Kansas City, Mo.:

Dear Sir—After reading a report of the St. Joseph meeting it struck me that I ought to send some photographs of plums to back up statements made in my paper. I can not understand why the Wild Goose should be put to the front when Poole's Pride or Kroh is far superior both in yield and quality of fruit. The tree is a good grower, bears early and enormously. The fruit is not as large as the Wild Goose but the seed is very small and the fruit has none of the astringency that the Wild Goose has and is excellent for canning. It is all nonsense that we can not grow anything successfully better than Wild Goose or Damson. With the right kind of treatment we can grow any of the Japan or Domestic varieties, at least we are doing so, but of course it would be a total failure if we failed to give proper attention to the essential things to be done. Possibly this particular locality is better suited to plum-growing than some other parts of the State, but be it so or not, if we are not too lazy we can grow choice kinds of plums. Yours truly,

E. L. MASON.

"MR KARNES ON THE PLUM."

I am going to say something about the varieties of plums that are profitable to grow, and I will say to begin with, that there is only one kind of plum that is safe to plant for money in this western country, and that is the true American plum. Any man that goes to fooling with Japanese or European varieties, unless he happens to catch an extraordinary dry season, like this one is, will have his pains for his trouble only, for I don't think there is any profit in them. Of course, there are some specimens that have grown to be very fine, but they are exceptions however.

The most profitable varieties I have ever grown has been the Wild Goose, supposed to have originated in Tennessee a little over fifty years ago, and like the Ben Davis apple, it has been the standard plum almost everywhere it has been planted. It commences to ripen from the first of June, and by the first of July you begin to pick Wild Goose, and it lasts for just about one month. It will come as near ripening every plum that sets as any plum in existence. I have known as many as eighteen perfect plums of the Wild Goose variety to ripen upon a single stem. After the Wild Goose, for succession of plums, there are two varieties that with me have been of equal value. One I have condemned until this year. I condemned it on its size and on its quality, but this year the exceptionably dry weather seems to have been the making of it, and that is the Pottawatomie. Previous to that I have always had for my second choice the Wolf Plum, but it has some drawbacks to it. It is better in quality than the Wild Goose, not as heavy a bearer, and the worst fault it has, it won't stand shipping. It will rot over one night. It is subject to the rot any way, but I find the Pottawatomie this year is exceptionally fine. I never saw them so large before, and never saw them of such good quality. They are a plum that will stand shipping as far as you want to ship them. I have shipped the Wild Goose and Pottawatomie over three hundred miles, and they arrived in good shape.

For succession after the Pottawatomie there are two other varieties that are of about equal value for late plums. They are the Minor and the Forest Rose. I think I like the Forest Rose a little better than I do the Minor. Either one of them are excellent fertilizers for the Wild Goose. It must be borne in mind that the Wild Goose is not a self-fertile plum, but must be planted in connection with some other varieties. The Forest Rose and the Minor are both large and of good

quality, good shippers and good sellers. I like the Forest Rose the best. There is one fault with the Minor Plum stock as it sprouts exceedingly bad. About every other year you have got to go through the orchard with an ax or grubbing hoe and do some grubbing on account of its sprouting.

Another one that I will mention, that is a great favorite with us, is the Hawkeye. It is good in quality, but I don't believe it will ever be profitable as a market plum. It is one of the slowest growers of anything I have ever tried.

One of the most profitable plums I plant, one of the easiest handled and most in demand of the late plums, is the Blue Damson. I would say plant Blue Damson plums for profit. Sometimes the winter will kill them, but as a rule, they are the most profitable that we can grow. It is good for several reasons. First: You don't have to pick it the day it ripens. It will stay on the tree for a month and keep after picked almost as long. It is in demand and always brings a good price and one of the best for preserving in the catalogue of plums.

A Question: How much do you sell off of the trees?

I will answer that question by saying I sold last year off of three trees, I turned over \$8.60 worth off of three trees. This year I turned over to the same party between seven and eight dollars worth. I don't know the exact amount this year. I could bring a number of witnesses to testify as to the profitableness of the Blue Damson plum. They are not present, but live in the vicinity of St. Joseph. I sold them last year at the rate of sixty cents for one of these eight-pound grade baskets. They average about one-sixth of a bushel. That is about \$4.80 a bushel. I sold Wild Goose plums this year for two dollars and a half a bushel, which is a pretty good price.

A Question: I desire to ask Mr. Karnes what variety of Damsons he raises?

There are two kinds of these trees. One is more thorny than the other. The thorny tree always does the best for me. One is a smooth tree and a rather upright grower, and the other is a thorny tree, and runs up as hoot, but not straight like the smooth bark variety, and the thorniest tree produces the best fruit. I would say plant the Shropshire Damson. I think it is equally as good as the Blue Damson.

A Question: Where is your market for Damson?

We ship to Nebraska and Kansas.

Mr. Hopkins: For \$4.80 a bushel?

Mr. Karnes: Yes, sir.

Mr. Hopkins: I just asked it because they have been quoted in the St. Louis market as low as a dollar a bushel.

I will say right here that the man that raises plums don't want to plant too many of them. You can't handle a large orchard of plums like a large orchard of apples.

Mr. Robnett: My trees are so thick I can't climb up in them. Do you ever prune your Damsons?

Mr. Karnes: No, sir; not much. It does not do well to prune them. I never tried pruning them much. The Wild Goose is a tree that I prune for the first four or five years by cutting it back. Unless you do, your limbs get so long and the foliage so heavy that they will break off, and I practice cutting back, and get better fruit. I practice the same thing on peach trees.

A Question: When do you do that?

Generally in the spring; February or March or April—any time along there before they bloom.

Now the package I market in. The only package that I market in, and the best I have found, is the common berry crate. I can get not quite two crates out of a bushel of plums. They run about fifteen crates to eight bushels.

I have raised Japanese plums that 12 is as many as you could get in a box. I have not used anything but twenty-four quart crates, and they carry better and sell better. For the local trade I use nothing but the eight-pound grape baskets.

Time is getting short and I am going to pass on and notice a few of the Japanese plums. I have tried Willard, Wickson, Red June, Burbank and Abundance. The Willard, Wickson and Red June went during the winter of 1898, and I never tried to replace them. They were all winter killed. Abundance I have tried for 12 years, and have never succeeded in getting anything like a satisfactory crop until last year. A mild winter and the remarkably dry summer, seemed to be the kind of weather that suits them and they did remarkably well. Many of the perfect specimens were two inches in diameter. Burbank the same way; but I would not advise anybody to raise Japanese plums, in order to get any money out of them. If you get any specimens they are remarkably fine, and they are pleasing to the eye, but they are not profitable to raise in this country. Most of them are early bearers, and they are very tender and they rot very easily.

Mr. Augustine: Is that your experience outside of that hard, severe winter?

Mr. Karnes: Yes, sir.

Mr. Augustine: In the same latitude still further north, where

I live, we are growing the Red June, Abundance and Burbank with wonderful success.

Mr. Karnes: As far as I know in this western country, Friend Augustine, the Japanese plums are not a success, although there are some still planting them.

Now, just a short talk on European varieties. They are like the Japanese, too much subject to rot. We have one plum in this country that has given a few crops of remarkably fine plums. They are of good quality and good sellers, and all right in every respect, if you could ripen them, but they rot. If there is any way of spraying them to prevent their rotting, or any way to prevent them rotting, they are all right. I refer to the Lombard plum.

There is another thing I can't see any difference in, in the fruit. It is the Bradshaw and the Lombard, and also one labeled New York State Prune by the nurseries. I can see no difference in them. They may be the same thing. As far as the fruit is concerned, I defy any expert to tell the difference.

A Question: Have you had any experience with the German Prune plum?

Mr. Karnes: It is not a success in this country. I have seen some grown, but not very many.

This year there are three trees of Green Gage plums in this city, and they had as fine a crop of plums as a man would care to look at. They were large, and the trees were well filled, and of as fine quality as a man could desire, but they are not a success here ordinarily. It was a warm season, and we had dry weather. Californians want dry weather during their fruit ripening season, and if we could have California weather here we could raise California plums. I have tried a number of the European varieties, but none of them have ever succeeded.

Now, just a word or two about one or two other things. I have a small plum orchard, a few hundred trees along the side of the chicken range. I never spray plum trees for plum curculio, or for any other purpose. Early in the spring I sow a little millet and a little rye along through the plum trees, and let the chickens do the scratching, and I have never been troubled with plum curculio.

Another thing, I think is the best scavenger we have, is the pig during the fruiting season. There are always a few bruised plums, and a few not fit to put in the basket for marketing, and a few pigs that can be turned in and let run for an hour or two will pick up everything in the way of a wasted plum in the orchard.

A Question: Do you ever cultivate a Damson plum orchard?

Mr. Karnes: No; I never cultivate a Damson plum orchard. Feed it as much wood ashes as you can and put it as close to the chicken house as you can.

STRAWBERRY PLANTING—RAISING AND HANDLING THE CROP.

(By F. H. Speakman, Neosho, Mo.)

The subject assigned to me by our secretary seems to cover about the whole ground, and I realize that one to do justice to it, must, if he meets the requirements along the lines of extensive production, be a master of the situation from the selection of the ground and its preparation to the placing of the product in the market. This is a wide range, and I hesitate to undertake so complicated a task and the remarks that will follow, will of necessity have more or less of a local application being based upon my experience at Neosho.

In the outset, permit me to say, that of all horticultural work the growing of the strawberry is my favorite. No doubt this partiality is due to the degree of perfection attained by this fruit in Southwest Missouri, which can truly be said to be the home of the strawberry, but I would not say the same for the peach. Of all productions of this region, and they are many and varied, none flourish better, if so well, as the strawberry, and none yield a surer return for labor rightly expended.

As our natural markets are the cities and towns north and northwest of us, most of them being too far away to reach safely by express, our efforts are directed to the production of sufficient quantities of fruit to make daily car lot shipments, and of this degree of production my paper will treat.

Of soils I prefer good timber upland, which has been cleared and cultivated thoroughly one year. This is in a condition to supply all the needs of the strawberry and contains sufficient humus to work easily and resist drouth well. My next choice is naturally good old land, which has produced a crop or two of stock peas. Neither of these soils will be benefited by the application of any kind of fertilizer, and I now avoid their use in every case.

Plow the ground early in the spring as thoroughly and deeply as possible, following in the furrows with the subsoiler that will loosen up the largest amount of clay or whatever happens to be present underneath. Do not fear bad results from this treatment. Such will never appear, I assure you.

Now, harrow enough to smooth the surface, but leave the ground somewhat loose.

About March 20th it is generally safe to begin setting the plants, and it is important in planting a large acreage that no time be lost. Mark the ground out both ways, the wide way three feet ten inches and the other three to three and one-half feet, according to varieties to be set.

In planting, get, if possible, experienced help, and allow them to use nothing but dibbles for the work. This tool should be about three inches wide and eight inches long, and is the only suitable one for the purpose.

Plants, of course, should be the best obtainable, and will be surer to grow and make a stand if they were dug in the winter. Plants taken up after the first sharp freeze, which usually comes in November, carefully cleaned of all runners and leaves and closely root-trimmed, then packed in shallow boxes, or kept in cool, moist cellars until needed, are much better than those dug as wanted in the spring. The greatest advantage these plants have is that they will keep much later than it is practicable to use the spring dug ones. Another advantage of winter digging is the having of that much work out of the way before the rush that is sure to come with the spring.

The planting operations being well under way the cultivators should be started and kept following closely. If the land is not too stumpy use a good two-horse cultivator that is provided with some kind of a scratcher attachment to level the surface and kill weeds that have been loosened by the narrow, deep running shovels, which should for the most part be used in the cultivation of the strawberry.

Keep buds and blossoms picked off and cultivate thoroughly both ways until runners come out freely; then, instead of destroying these runners until July, as recommended by some planters, train them carefully along the rows as they will be needed and cultivate but one way. Hoe when necessary, but do not attempt to do it after every rain.

Much of the labor expended by the average strawberry raiser in trying to cultivate and hoe his plants as often as it rains is worse than lost.

As the season advances and runners come out freely, assist them, if necessary, to fill in the spaces evenly, cultivating a little farther from the center of the row each time, and carefully avoiding the windrowing of the runners along the edges of the rows.

By the 1st to the 15th of August the rows, if the weather has been

seasonable, and the proper treatment has been given will be 20 to 24 inches in width.

Now, instead of putting the rolling coulters on the cultivator and treating your plants as you would an Osage hedge that was getting too high, stop the cultivator and watch conditions closely. Do not concern yourself about the plants that form in the spaces. There is something more important for you to do just now. This is the time that the average grower makes a vital mistake. This is the time that the writer in the early days of his strawberry experience carefully cultivated between the rows and watched for every little weed to appear, but failed to note that his plants were getting thicker and thicker, now two inches, now an inch, now half an inch apart, now two, now three plants in depth all over those rows. They were beautiful to look upon, but, alas, yielded a very large crop of disappointment only.

I was partly excusable for this mistake as in my search for information on the subject of strawberry growing I think all writings consulted emphasized the importance of watching the weeds to destroy them as they appeared.

Let me emphasize the necessity of watching the plants that they do not pile up too high during the months of September and October. My plan is to watch the plants closely, and as soon as I find a sufficient number of them firmly rooted, go over the rows with light four or five tined potato diggers, scratching across the rows and tearing out all weak plants that are running in profusion in every direction. It will be necessary to pull many of them off with the hand after drawing them out into the spaces. Men, to do this, should have good judgment, and to be valuable, must keep their minds on the work.

One thorough treatment may be enough, but if the weather is very wet, two will be needed.

This brings us along to, say November 1st. Now get the cultivator again and destroy the plants between those rows, cutting them down to the width we left them when cultivation ceased. Finish the treatment of the season by following with hoes carefully, removing all mutilated plants and all of those innocent-looking weeds which come up in the fall, grow all winter and blossom and produce seed at the time the strawberry ripens its crop. Their name is legion, and they sometimes do great injury if not removed.

Now you can leave the strawberry fields for a few months unless you linger to put up the sheds that will be needed in the spring. Mulching for best results should be done in the spring to avoid the strong growth of wheat, cheat, etc., which invariably follows the ap-

plications of straw, the only available material for the purpose which we have in any quantity. A very thin covering on the ground around and through the plants is all that will be beneficial, and this is needed simply to keep fruit clean.

So much for the raising. Now, the handling will be a comparatively simple matter. Much thought should be given to the rules governing the picking and other work. Clearly define the duties of the record keepers, field bosses and pickers. Give a premium for satisfactory season work. This will do wonders to hold pickers in line when most needed. The addition of the premium to make the amount per box which you intend to pay. Pay pickers only at the end of the season. I never did, and have no intention of ever using tickets with which to pay pickers. The record system is far better.

Provide a cheap but commodious shed (that can be moved without injury when needed in another place) for every ten or fifteen acres.

The best record keepers will be found to be those persons who are the greatest success in the school room. Give each one the direction of the work in the shed. A field or row boss should not be given over fifty pickers and should be instructed to work in close harmony with the record keeper in seeing that every picker does his work properly. It is possible for the extensive planter to pick, pack and place in cars for shipment 1,000, 2,000, or even many more crates per day of strawberries that have been more carefully handled than the average grower handles the product of his one, two or five-acre patch.

It is a business, however, and one to succeed in it must begin in a small way. The idea that strawberries cannot be grown on a large scale is an unbusinesslike and foolish one. Fifty acres can be grown and cultivated and the product marketed at a much less expense per acre than the patch of two acres. The proper system will do it.

No one without a strong love for the work should attempt extensive production, however, as he will surely fail in many of the almost numberless little details which all come in for a share of attention.

The following were appointed delegates to various State Horticultural meetings:

Arkansas—G. A. Atwood.

Iowa—W. H. Maxwell.

Illinois—M. Butterfield.

Kansas—W. G. Gano.

Nebraska—L. A. Goodman.

THURSDAY—December 5, 8 p. m.

The programme of the evening was varied by songs and recitations, and a very pretty flag drill executed by twelve young ladies of the Todd school.

VARIETIES OF PEARS AND PLUMS.

(By W. L. Howard, Assistant Horticulturist, Columbia, Mo.)

VARIETIES OF PEARS.

In selecting varieties of pears for planting, some important points must be kept in view. One must consider the relative time of ripening of the fruit in order that it may be marketed with reasonable convenience with the facilities at hand, and also questions of pollination, so as to have mutually fertile varieties which bloom at the same time, planted close together. It is impossible to name any certain number of varieties which will succeed in this State, because, apparently, their success or failure is purely a matter of local conditions. The pear growing industry for the United States has been developed fully, only in the Eastern and New England States. There the list of successful varieties is not long, as compared with some of the other fruits like Apples and Plums. All told, but 28 varieties have proved to be reliable, as reported by practical growers, and there are instances where some of this number did not do well in some sections. For Missouri conditions, the following 13 varieties are recommended by growers as being the most reliable for the State at large, although some failures may be expected in some localities from causes not yet understood. Anjou, (called also, Buerre de Anjou); rather large, fine grained, excellent flavor; ripens in late fall, but keeps till far in the winter. Angouleme, (known also as Duchess de Angouleme); very large, buttery, juicy and very good when well grown, but poor and worthless when small; ripens in midautumn. Bartlett; large, flesh nearly white, tender and buttery, and with a moderately rich flavor; the best summer variety. Buffum; size medium, skin yellow, with a broad, reddish-brown cheek, somewhat russeted; flesh sweet, very good but slightly variable; is a good producer; ripens in fall. Clairegeau, (also known as Buerre Clairegeau); large, often with a crimson shade

toward the sun, and numerous brown dots; flesh buttery and melting and with a rich flavor, but frequently poor; ripens in winter. Howell; rather large, light yellow, frequently with a handsome cheek; moderately rich flavor and somewhat variable in quality; ripens in early fall. Kieffer; everybody knows the Kieffer and all have condemned it at one time or another, but, like the old Ben Davis Apple, it continues to turn up in the markets to a larger extent than any other sort. Lawrence; size medium, lemon-yellow, with numerous small dots; very good flavor; ripens in early winter. Louise Bonne, (also called Louise Bonne de Jersey); large, flesh yellowish-white, juicy and fine; hardly of the best quality, but very productive; a fall variety. Mt. Vernon; medium, dull brownish russet, with a red cheek; rich flavor; ripens in fall and keeps well. Seckel; small skin brownish-green, becoming rich yellowish-brown, with red cheek; the richest and highest flavored pear known; a summer and fall variety. Seldon; medium, or large, flesh coarse, but juicy and brisk flavored; ripens in fall. Winter Nelis; size small or medium, sweetly aromatic, with excellent flavor; a winter variety. New varieties not generally tested are, Krull, Koonce, Lincoln and Sudduth.

Kieffer and Bartlett are usually classed as self-sterile, but the degree of sterility varies in different places and under different conditions. Probably any variety will fertilize any other variety in case the two bloom at the same time. The safest plan in setting a pear orchard is to plant not more than two rows of one variety together, and to alternate with one or two rows of another variety. The most popular variety in the eastern Pear district is the Bartlett, with the Kieffer holding second place. With these growers the Seckel is a prominent variety, and is the standard of quality.

The Duchess is the best dwarf. It sells on account of its size, for it is of indifferent quality. Other popular dwarfs are, Louise Bonne, Anjou, Clairgeau, Manning Elizabeth, and, to a less extent, Bartlett and Seckel.

VARIETIES OF PLUMS.

At the Station we have 15 varieties of plums that are fruiting. The most of this number are European sorts, but there are a goodly number of American varieties and some of the leading varieties of Japan. This is only a rough way of classifying Plums. The botanical arrangement as adopted by the American Pomological Society is to divide the principal members of the Plum family into five sections as follows:—*Prunus Americana*,—or those derived from our common wild Plum; *Prunus angustifolia*,—of American origin, but including

only those of the Chicasaw type; *Prunus cerasifera*, sometimes classed as European, but rightly contains only those like Marianna and De Caradenc; *Prunus domestica*, which includes all of those known as Europeans; *Prunus hortulana*, commonly known as American of the wild Goose type, but also embraces the Miner and Wayland groups; and, *Prunus triflora*, the Japanese sorts.

Taking them alphabetically, some of the varieties will be discussed. The American Golden and the Golden Beauty are very much alike, flower and fruiting on about the same dates; both are small, round, yellow and hard, ripen late, and too well known to need further mention. Abundance and Botan—names used synonymously, represent the Japanese type at its best. Burbank, Wickson, Yellow Japan and others of this type have their respective merits, but none of them are of finer quality, and certainly none are so sure to set a crop of fruit and ripen it as the Abundance; they are usually large, fine-textured, juicy and of delicious flavor. Chas. Downing makes a fine tree, usually produces a medium crop of average sized fruit which somewhat resembles the Miner in appearance, but is not of so good a quality, and, as these two ripen at about the same time, it would be unwise to use it instead of the Miner. Coe's Golden Drop; this is mentioned because in the East it is reported to be a desirable variety, but I have not seen it amount to anything; a rampant grower, blooms abundantly every season, sets a big crop of fruit, but never holds it; a fine, late, exceedingly large Plum when it ripens—which is so seldom that we have it only in the form of a beautiful memory. Cummunia, is a dark colored Plum, which rots pretty badly, but the tree sets such an enormous crop of fruit that there is a respectable yield left after half have rotted; a desirable European sort. De Caradenc often has a big crop of very pretty fruit, but is chiefly valuable on account of its earliness, ripening as it does about the 20th of July. De Soto is one of the old standard varieties, yellow in color, prolific bearer and a sure fruiter, but shorter lived than many of the others. Forest Garden can always be relied on to have a crop that will make the housewife smile; size above medium, yellowish, and free from rot. Forest Rose is good for home use, but is too tender to ship well; a desirable American variety. Garfield; along with this might also be classed Moreman, World Beater, Wayland and Missouri Apricot—all of which would make good buck shot, they are so small and hard; however, these have their uses; they are especially desirable for shipping long distances, preserving and spicing. Gold has not done much with us yet, being too young, but is said to be promising. Golden Mammoth has not fruited with us yet, but is given a good

reputation by those who have seen it. Goliath; this is rather a weak grower and does not fruit every season, but when it does "hit," it will make you glad: very large, firm of flesh, and does not rot badly. Grand Duke; here is one that has special uses and should have a brilliant future before it; tree vigorous and healthy, of European type; fruit fine large, dark in color, pear-shaped and covered with a heavy grayish bloom and seldom or never rots; it has firm flesh and would make a good shipper. The special use to which Grand Duke could be applied is to place it on the market as a substitute for the expensive California sorts. This is not theory, for we have sold this Plum to retail dealers at fancy prices and I know for a certainty that fastidious customers took them and were well pleased. The fruit is at its best about the second or third week in September. If picked and carefully placed in shallow boxes, about a dozen in each, there is no reason why a few trees of this variety should not yield as good an income as a whole orchard of the kinds that have to be sold for ten cents per gallon. Jefferson, is rather a weak grower, but has fine large fruit; it is somewhat subject to rots, but is promising. Lafayette, is another European, somewhat like Communia, in that it produces very large crops and about half of the fruit rots, but leaving enough for a good harvest. Magnum Bonum; here is a variety that is among the largest of Plums and in some localities appears to do well, but with us it has fruited but scantily: it was a favorite with the late Judge Miller. McLaughlin is fine, delicate and large, but from some cause does not set but a few fruits to the tree. Merunka; this an European variety, which, in its manner of growth and productiveness, resembles the Damsons, but it is not so purplish in color and rather smaller in size: it is valuable for cooking purposes and is liked by some for eating from the tree, when well ripe; the seed is free. This variety is well worth cultivating. Middleburg is an American sort that produces well some seasons, but has too many off years. Milton ripens about the first week in July, and is a desirable sort on that account only, as its quality is not of the best. Miner is too well known to require any description; Moore Arctic is a European sort, probably originated in this country, that is worthy of a place in the orchard: it is very dark in color (almost blue), covered with a heavy grayish bloom, is a little above medium size, and sets a heavy crop almost every year; its principal drawback is its tendency to rot. Newman; probably worth more as a pollinator for the Wild Goose than for anything else. Prince Englebert; one of the largest Plums but does not bear enough. Quaker; here is a native Plum of good size that for delicious eating is hard to beat: valuable for culinary purposes, too.



A SPECIMEN WHITE SPRUCE.

Reine Claude de Bavay; this one should be included in planting, although it does not fruit heavily every year; ripens middle of September when others are scarce; gets sugary and delicious; it is a white or greenish, European. Robinson; an American and a sure fruiter being loaded down annually; fruit not first class in quality, but fair. Rollingstone, Wyant and Wolf each have their merits. Stanton is an excellent late European variety. Union Purple is fine and large, but nearly always rots. Victoria is a beautiful thing when it chances to ripen, but it is a shining mark for rot. Wild Goose is a leading commercial variety, but needs a pollinator; Newman answers the purpose. Yellow Gage is susceptible to rot but when it escapes is fine.

Many varieties possessing some merits have been omitted for fear of making this report too long. In a test this season to determine what varieties were able to fertilize themselves, it was found that one-third of the total number were more or less self-sterile. This was determined by placing paper bags over several of the twigs on each tree before the flowers open and afterwards noting how many set fruit in the sacks. It has not yet been satisfactorily worked out just what varieties are incapable of fertilizing themselves nor the best trees to plant for pollinators, but it is conceded by all who have investigated the subject, that there should be a mixture of varieties in the plum orchard.

ORNAMENTATION OF HOME GROUNDS.

(By Ruth Jackson, Columbia, Mo.)

There are two distinct types of landscape gardening—the geometrical and the naturalistic. To these Edward Andre adds still another, the composite style, which is a blending of the other two.

According to the geometrical style of landscape gardening, the grounds are laid out in squares, circles or other geometrical designs; the trees are planted in straight rows, the shrubs trained to regular patterns, the walks and drives from definite, and sharp angles. On the other hand the naturalistic style attempts to follow the plans suggested by nature. It cannot be wholly natural, for there must be walks, drives, fences and buildings, but these may be so arranged as to harmonize with the natural features about them.

As to the relative value of these two styles of landscape art, we may say they are of equal merit under certain conditions. The geome-

trical style may be followed with pleasing effect along public boulevards, around large buildings with steeples and spires and particularly a large building on a small area. It heightens the outline of the building and emphasizes its importance. Many other places might be mentioned where the formal style of gardening would be effective and desirable. But over large estates in rural places and suburban homes where the character of the surrounding landscape retains much of its natural beauty. A formal system would be entirely out of place. The fault, therefore, in much of our home gardening lies not in the system, but in the wrong use of that system. It is true that there are many pretences toward either a formal or informal system, which are complete failures. But again it is not the fault of the system, but the inability of the gardener himself, who is merely a grower of plants and who has not the keen perception of a natural artist.

If we would succeed then in landscape art, we must, first of all, have a special love for the beautiful in nature. We should be familiar with our nature trees, flowers and shrubs and varying effects of form, size and color. We should then begin, first with a careful study of the natural resources of any given place from a landscape point of view. There is no spot either among mountains at the seashore or on the rolling prairies which does not have its own original beauty. There may be massive trees that are impressive from their size and age, which man, by one foolish act, could destroy—thus undoing what it has taken nature years to develop. There will always be something in the contour of the land, in the plant growth or the general outlook of the grounds that will be worthy of our serious consideration. To make or to mar this lies in the province of man.

He who succeeds in preserving the natural charms of a place, its spirit, and sentiment, though he does not attain the highest perfection, is far in advance of the one whose first attempt is to obliterate every thing natural in order that he may substitute some stilted and artificial plan.

Tho the landscape artist has given due respect and reverence to nature, that is not all that remains for him to do. It is only a right beginning.

He has not the artificial features—walks, drives, fences, etc., to blend and harmonize in his landscape. The walks and drives should be as few as convenience will permit; "they should neither be so straight as to lack beauty, nor so meandering as to lack good sense." There should be a legitimate reason for a curve in a drive. Sometimes there will exist naturally a small hill, a clump of brushes, or a tree that will offer sufficient reason for turning aside. Otherwise

one can make the curve seem natural by planting shrubs or a tree in those places. Whatever may be his device, it should be something that is permanent and real. Something that could not be destroyed or easily removed. For instance, a flower bed would not be a permanent obstruction. It would offer no resistance to passing wheels. Not only would it be unsuitable on account of its trivial transitory nature, but on grounds which are large enough to require a road, a flower bed would be entirely out of place. The same principal holds true in the construction of paths as in the construction of drives. Paths and drives are for utility and not for beauty. Then with that aim—and only that in view, should they be built.

We have still a more difficult problem to meet than that of walks and drives, and that is what to plant and how to plant it. These are questions that ought to be raised by nearly every one, for there are few places but what could be improved by a judicious planting of ornamental plants. In the words of Mrs. Rensselaer, "two trees and six shrubs, a scrap of lawn and a dozen plants may form either a beautiful little picture or a huddled disarray of forms and colors." Too often instead of a beautiful picture we have a "huddled disarray." But even that is better than no attempt at all. It shows a slight appreciation of the beautiful.

But to return to our ideal garden. In this we would have shade trees, shrubs, hardy climber, annuals, perennials and a well-kept lawn. There must be harmony throughout not only with the individual details, but with the landscape beyond. There must be harmony of color, form and structure. How to obtain these is the work of the artist.

The most valuable plantings from a standpoint of beauty and utility, are the shade trees. Their artistic value is embodied in the three qualities, form, texture, and color. The form of a tree is determined by its outline as described against the sky or other trees. In this it may be elliptical, oval, pearshape or of various other outlines. Structure is another important factor in determining the form of a tree. This includes the manner of branching, which may vary all the way from the drooping habit of the willow to the aspiring branches of the poplar. We can, thus, readily see the inharmonious effect in massing trees of these two extremes as the willow and the poplar. The texture of a tree is determined largely by the form and density of its foliage. Let us compare, if you please, the leaves of the arbor vitae and those of the pine, the great trembling leaves of the cottonwood with those of the weeping willow, the catalpa and cedar—the extreme difference is apparent.

Again the color of the bark and foliage is quite as important an element from an artistic point of view as form and texture. All shades of green, blue, white, red and orange are represented. In this we have equally as great a variation as in form and texture. Then what is the gardener to do with such diversities of color, texture and form. He must know his trees. He must know them as they change with the seasons and with the years. If he is not able nor willing to do this he must take the results of chance.

As time is limited let us pass on to other features of landscape art that deserve our attention.

There are multitudes of hardy climbers and annuals that may be employed over porches, trellises, arbors and against the bare masonry of buildings. Climbing roses and honeysuckles, for example, wisteria, Virginia creeper, clematis, trumpet vine, cypress, maderia, the wild grape and the hop vine must not be forgotten. Not all will look well together nor be suited for all places. Each has a special charm and beauty of its own determined by its habits of growth and the character of its flowers and foliage. Hardy climbers are more effective in uniting the lawn and walls of the house than annuals, which are present for a season and then gone, leaving not only the junction of the soil and walls bare, but the work to be done over again the next year.

Flowering shrubs is another necessary element in the ornamentation of home grounds. Like the climbers there name is legion. We have all gradations, from the little deutzia on the one hand with its low spreading top to the upright honeysuckle, barberry and flowering crab. It is in this profusion of species the danger lies in selecting the proper forms for the proper places.

Here again the gardener should know his plants. He should know those that first put forth their leaves in spring, the time of blooming, the character of the flowers and fruit. In general mass those shrubs with the darker restful colors in the back ground, and those of lighter shades in the foreground.

Select those forms that blossom successively, for it is in this constant change we have one of the principal charms of the garden.

If we attempt the naturalistic style of gardening, let it appear natural. Don't destroy the lawn and the whole effects by dotting here and there pattern beds with bright and variegated foliage that stare at us the summer long like a painted sign.

Pattern beds are not the only monstrosities that appear on our lawns. Equally as bad are the camp kettles, vases, fountains, paint buckets and even sewer tiles are seen promiscuously scattered about on

the lawn. What could be more unnatural and out of place? Schiller tells us that, "If the art of gardening is at last to turn back from her extravagance and rest with her other sisters, it is, above everything, necessary to have clearly before us what we require. It is certainly tasteless and inconsistent to desire to encompass the world with a garden wall, but very practicable and reasonable to make a garden into a characteristic whole to the eye, heart, and understanding alike."

PEACHES IN NORTH MISSOURI.

(By A. W. Bloomfield, St. Joseph, Mo.)

The origin of the peach is hidden together with the prehistoric life of the Aryan tribes of Central Asia. The primeval home of these early tribes was on or near the 40th degree of north latitude. In fact the Turko-Siberian city of Bokara, for which a well known variety of peaches has been named, is located exactly on the parallel mentioned above.

This 40th parallel north separates our neighboring states of Kansas and Nebraska and running thence east bisects Andrew county this State and the other counties in the second tier from the north line. I have shown that North Missouri is in latitude with the native home of the peach. Next let us see if other physical environments are similar. The altitude of Central Asia in general is high and the surface is drained by several large rivers running in all directions. The soil must be somewhat sandy and the air dry, as the country is dotted with arid deserts.

The altitude of North Missouri ranges from 1,000 to 1,200 feet and the nearness to the more arid regions between us and the Rocky Mountains insures us the proper aridity of atmosphere.

Our upland soil formerly covered with timber, is much of it of loess formation and contains sufficient sand to make it well adapted to the growth of the peach tree.

My effort to prove North Missouri an ideal peach district would be futile, unless substantiated by facts gathered from recent crop results.

In the last ten years eight full crops of peaches have been raised in Northwest Missouri. Can any other section of our State make a better showing? This year the writer sold the crop from one acre, consisting of Elberta, Champion, Crawford, and Summer Snow peaches, for \$352.

Twelve years ago Mr. Hopkins of Springfield in a paper read before this Society at Lebanon, said: "I cannot advise our friends in the

northern part of this State to set peaches extensively for commercial purposes. They will not pay." Does eight full crops in ten years of any fruit pay? It surely does. Especially of peaches. Was not Mr. Hopkins surely wrong in his conclusions?

With the proper kind of soil in which the peach does best, the right altitude, and a latitude similar to its indiginous home, we *can*, we *do* and we *will* grow big peaches, not only for home consumption but for commercial purposes also. All the common commercial varieties fruit well here. The Elberta, Champion and Crosby, leading as favorite varieties. Our loess soil does not require cultivation throughout the entire life of the peach tree. I cultivate until the fifth year when I sow to red clover—mowing off the first crop and allowing the second to fall to the ground to reseed and make a winter cover. The only enemies the peach has in North Missouri are an occasional borer and the leaf-curl, neither of which does serious damage.

All hail to the luscious peach. If the apple is the "king of fruits," then has Pomona surely crowned the peach as the "queen of fruits." It vies with the strawberry in delicacy and flavor and defies the art of man to counterfeit it in color.

A PLEA FOR A MORE NATURAL COURSE OF INSTRUCTION IN ELEMENTARY SCHOOLS.

(By John R. Kirk, State Normal, Kirksville, Mo.)

The typical school falls short of its possibilities because it ignores the nature of the children and bends their energies to the acquirement of conventionalities. It represses the natural impulses of childhood instead of directing and utilizing them. It inhibits habits of action and tends to destroy the power of initiative instead of developing that power. It withdraws the child's consciousness from visible and tangible things among which he lives and must live. It fills him with facts remote from his unavoidable sphere of action. It receives children who are fond of serving others, full of willing energy and, by both nature and habit, industrious. It sends them back with distorted ideals and a distaste for doing the world's work.

Let us survey our field of action and get our bearings: Reformers too often magnify their isolated specialties and fail to see things in their relations. We need practical science in elementary schools. This can not come without the contemporaneous organization of several related subjects.

We live in a world which can be known in one way only. That way is through the senses; but the typical school ignores sense training. It sometimes does worst by inflicting irreparable damage to the senses of its victims.

School education should start right and keep right. The school-master fails because he does not recognize the foundation on which education is based. We hear him harping on the "fundamentals." He believes the three "r's" to be the "fundamentals." The truth is that these supposed fundamentals are mere *conventionalities*. They are *necessary* but they are *not fundamental*. They are both conventional and changeable. Back of them the truly fundamental, the absolutely preliminary, is the consciousness of visible and tangible realities brought into the soul through the senses. No poet or scientist ever made great contributions to human progress who had not large opportunities to build up the truly fundamental conceptions in consciousness through the use of the senses. Dr. Karl Lange says: "The knowledge which a well trained child of six has acquired surpasses in value the acquisitions of any student during his university period." Dr. Krohn cites other authorities to the effect that the acquisitions of the first six years surpass in value all later acquirements including those of the university period.

The typical school ignores the motor activities and treats the child as a bundle of receptive faculties. It crams him with verbal expressions for things; but the child wants *to know things at first hand and how to do things*. In doing he learns and thus increases his power. This is nature's way. How long do the children retain the systematic and cyclopedic knowledge which we gorge them with? You know how long. They retain it until the annual examinations are over. Then they unload it from their memory as fast as they can and get back into their own precious ways of living among their interests and among what they can assimilate.

The natural child lives in a world of sense and of imagery. All his myth making is related to the product of his sensations and built upon them. Dr. Halleck, speaking of how Shakespeare's senses were trained, says: "In his sensory experience is to be found the foundation of all those imperishable structures given to humanity by his heaven-climbing genius." Dr. Halleck further says: "On account of his father's pecuniary difficulties, Shakespeare probably left school shortly after passing his fourteenth birthday. This was extremely fortunate. Had he not left school at that age we might today be without the greatest dramas of all time." In Williams' "Homes and Haunts of Shakespeare" we find: "His mind became a vast reservoir of facts and fancies, but the

facts were not acquired nor were the fancies stimulated within the dingy walls of King Edward's Grammar School. The Stratford meadows, gay and bright with flowers from early springtime till late autumn; the Wier Brake, where the earliest primroses come and 'where the nightingales sing the night long;' the noble forest or Arden which stretched away through Northwestern Warwickshire, with its hunting scenes and woodland idyls; the Whitsuntide celebrations, the May-pole dances, the sheep shearing festivals, and the mystery plays; and on the banks of the Avon, less than a dozen miles away, the noble castles of Warwick and Kenilworth, these are some of the places where Shakespeare acquired his education."

I cite another illustration: In 1867 the talented Dean Farrar began a crusade in England for Elementary Science. He says: "I was of course howled at as a hopeless Philistine by all who were stereotyped in the old classical system." He gives some letters from Charles Darwin, one of them written March 5th, 1867, wherein Darwin says: "I admire your candor. Had I been a great classical scholar I could not have judged fairly on the subject. I am one of the root and branch men. I would have classics to be learnt by those who have sufficient zeal and the high taste requisite for their appreciation."

Then Darwin further says: "I was at school at Shrewsbury under a great scholar, Dr. Butler. I learnt absolutely nothing except by amusing myself by reading and experimenting in chemistry. Dr. Butler found this out and publicly sneered at me before the whole school for such gross waste of time." Dean Farrar says, "This letter of Darwin is something of historical interest in the annals of English education." He also says: "Now there is no large school in England that does not offer its pupils some practical and experimental knowledge in science."

Bungling mediaevalism in many city schools makes school unattractive, drives children prematurely into the street and shop, then by the clumsy patchwork of night schools seeks to reclaim the children from the condition of "arrested development" into which it has driven them. Conservatism, now as always, cries "Let good enough alone. Don't disturb us with new ways. Don't force us to open the old channels in our brains. Let us run in the old grooves and avoid friction." This is the voice of conservatism which is ever camping on the abandoned trail.

No enlightened, progressive man is worried about the over-crowded curriculum. The curriculum is crowded only where plodding mediocrity and sleeping inertia refuse to discriminate, select and utilize such material as is adapted to the children who are furnished them for exploitation. Where the scientific spirit and the laboratory method permeate the school work there we find the best work in literature, grammar and arithmetic, and in all that is good in the old time curriculum. Then

by the use of elementary science and the opening of the avenues to the souls of the children the real fundamentals are used as a basis for the conventional and favorable results are obtained. I can cite schools exemplifying the new education whose second grade children do as difficult work in arithmetic as the fifth grade children do under the old regime; where the children are not hurt by such work and do no home studying; where the sixth grade children do as difficult work in literature as we find high school students doing under the old regime. The new education reserves in large part the enormous energy hitherto consumed in conducting examinations and grading papers and it devotes this energy to preparation for the labor of real teaching. I think the battle for science in elementary schools, i. e., for organized Nature Study, is almost won. There will doubtless be mismanagement. Foolish people will make a sorry mess of Nature Study. Ignorant people will butcher it. People unused to the Biological and Agricultural laboratories had better let Nature Study alone. Greek is in good repute because reckless novices seldom get at it. Nature Study may need to be protected from its friends but it will not die with them.

Dr. Woodward of Washington University says: "Well equipped laboratories and well planned courses of laboratory work in physics for secondary schools are scarcely twenty years old, but they form a most striking feature in secondary school work at the present time. Still more recent than either chemical or physical laboratories are laboratories for the study of botany and zoology in secondary schools." He says, "It was felt that many boys have such a dislike for grammars and dictionaries involving great memory work and such a strong taste for physical activity which calls into play both mental and physical functions that they prefer to be called stupid, dull and ignorant rather than endure the restraints and ennui of the ordinary school." Hence Manual Training came for the relief of the boys. He further says: "It was feared that such mean and vulgar matters as carpentry, forging, metal fitting, etc., would lower the pupils' tastes and make them sordid. Parents gave utterance to a suspicion that Manual Training would lead a boy to seek associates among carpenters and blacksmiths. These fears, suspicions and predictions provoke a smile today, for every teacher of experience knows that the fears were groundles and the predictions false. Nowhere does one find young men of higher character, of nobler aims, of more refined tastes than he finds among those who have taken a thorough course of Manual Training as part of their educational work." Speaking further Dr. Woodward says, "Domestic Science as well as Manual Training has secured permanent footing in grammar grades. No longer will any city school system be considered complete which does not fur-

nish to its boys elementary tool work during the seventh and eighth years of their school life and to every girl of the same grade either the same as the boys get or the elements of needle work, plain sewing and tidy house-keeping." He further says: "It is scarcely sixty years since Froebel organized his little children's garden, yet the kindergarten is now well established in every progressive community. The watchwords of the kindergarten, unity, continuity, self-activity, freedom, characterize the new education from first to last. They really cover all that has been done in Nature Study, Sloyd, Manual Training and in the laboratory methods of higher education."

The late lamented Dr. Hinsdale of the Michigan University said a short time before his death, "Nature lessons and literature are presented to the child while his faculties of observation and imagination are quick and active and his curiosity is alert. Lessons of a more abstract character as grammar and theoretical arithmetic are held in reserve until his powers of reflection are more fully developed, i. e., to the seventh and eighth grades."

The studious and scholarly Dr. John Dewey of the Chicago University, speaking of these subjects, says, "We learn from books only as they are related to experience; but the ordinary school has been so set apart, so isolated from the ordinary conditions and motives of life that the place where the children are sent for discipline is the one place in the world where it is most difficult to get experience, the mother of all discipline worth the name. The occupations supply the child with a genuine motive. They give him experience at first hand. They bring him into contact with realities. Plato speaks of the slave as one who in his actions does not express his own ideas but those of some other man. The introduction of active occupations, of Nature Study, of Elementary Science, of Art, of History, the relegation of the merely formal to a secondary position, the introduction of more active experimentation and self-directing factors, all these are not mere accidents. They are necessities of the larger social organization. The child comes to the traditional school with a healthy body and a more or less unwilling mind. He does not bring both his body and his mind with him. He has to leave his mind behind because there is no way to use it in the school. If he had a purely abstract mind he could bring it to school with him; but his is a concrete mind, interested in concrete things and unless these things get over into school life he can not keep his mind with him."

My friends, these witnesses can not be ignored. These are men who are living for the highest purposes. They are living where the din of combat is most intense. They are practical men. They are scholarly

men. They are not speaking to hear themselves. They are great leaders. We should ponder long and well the things they say.

The voices of these men summon us from our lethargy. They point us in the direction of the new sociological organization. They point us to the electric car, the arc light, manufactured ice, filtered water, vaccination, insecticides, disinfectants, pure food—to all the products of recent scientific advancement. Is it not, therefore, evident that the school-master should open wide his eyes and seek so to organize education as to contribute to the comprehension and mastery of these forces? Rational school education is inseparably inter-woven with these agencies of our industrial and social life. It is a product of them. It reacts upon them. It stimulates their increase, improvement and use.

But mark you, this rational new education means not less of the beautiful old classical culture and art, not less of mathematics, not less of serviceable knowledge of any kind; but it does mean a clearer, quicker comprehension of all knowledge by starting with the building upon and living in what is really fundamental, i. e., the world of sense around us.

Our vast industrial system calls constantly for young men who can use the mechanical forces furnished the world by science. The old fellows will not do. They can not learn. Their time of plasticity is past. Our boys! They are the ones with capabilities. They are the ones in the critical stage of susceptibility. We must give them the instruments of science that they may learn to handle such instruments while they are boys. A little later their curiosity flags and their constructive and creative imagination has gone from them forever.

One enormous obstacle nearly everywhere retards progress. It is the examination machine. One year ago at an Association in this city it was announced with exultation by a devotee of the mechanical scheme of education that children coming to his school from schools using or attempting to follow the new education failed in the examinations.

To this I add: Such is always the case. My friends, remember this: Children crammed with verbal lore and trained to reproduce it in specific form can so reproduce it. Others can not; but the reproduction of such verbiage is not evidence of thinking power. Success in passing such examinations is not a part of the child's self-expression. Such tests make of the children mere sounding boards to reflect the things hurled at them by mechanical teachers.

The children taught in the spirit of the laboratory and the shop think in visual images or other forms of their own. They speak from pictures in their minds. Where the examination machine predominates, the image in the child's mind is the image of words and of the paragraphs of pages.

In conclusion, I may ask, how far are we? Really we have advanced but a little way. It is only ten years since the first actual laboratory for natural science in a high school was equipped in Missouri. I mean a laboratory conforming to existing ideals of science teaching. It is but nine years since your present speaker, directed and supported by the Secretary of this Association, fitted up in a simple way the second one of such laboratories for a high school in the State of Missouri. The three great cities wield a powerful influence. Two of them are probably friendly to organized science in elementary schools. One of them has made some advancement in the direction of such science. It has abandoned part of the cyclopedic geographies; it takes the children to the hill-sides and fields; it opens their eyes to the things that are to be seen and heard and understood; it takes classes into the blacksmith shop and into the big factories where children record their observations and for weeks thereafter work into organized form their observations and the information which they get from books. Unfortunately, as I see it, one of our large cities is rather lethargic though friendly to real science and one of them is not merely lethargic but actually unfriendly to every movement which goes outside the traditional, mechanical and conventional textbook regime.

At least four State institutions are unequivocally and heartily working for this wholesome movement which is to open the avenues to the consciousness of our sons and daughters. The State University and the State Normal schools are doing what they can in behalf of this great movement. Many scholarly and courageous men and women of our State who see the right are struggling to do the right. Mediaevalism, conservatism and the examination machine, inch by inch, are yielding.

In the State Normal school at Kirksville there is an Agricultural laboratory for nine months of observation, experimentation and generalization by students. The course is elective. The department is crowded to its full capacity. Men and women from eighteen to forty years of age take this course of instruction that they may go out into the schools of Missouri and give it again to Missouri children. I am pleased to report that the demand for such teachers is greater than we can supply. But you ask: What can the elementary schools do with science by laboratory methods? Last year the seventh and eighth grade children of our Training School were given in our Agricultural laboratory nearly the same course as the grown up men and women. They performed nearly the same experiments as were given the men and women. We obtained from them nearly as good generalizations as from the full grown students. Moreover, the children were delighted with the experiments and with the work.

Really our greatest drawback is the lack of teachers who have learned science in the laboratory, the only place where it can be learned so as to be thereafter serviceable. Unscholarly and unscientific novices can not do the needed work. We want teachers who have not only science but scholarly attainments in language, literature, history and art, indeed in all things. And above all we want teachers who will teach the children rather than the text-books, who think more about the children than about the mechanical curriculum, who realize that the school is for the children and not the children for the school.

THE MISSOURI AUDUBON SOCIETY.

A SOCIETY FOR THE PROTECTION OF BIRDS.

(By O. Widmann, Old Orchard, Mo.)

After twenty-two states of the Union had established their Audubon Societies during the last five years, a few St. Louis men came together in June of the present year to organize such a society for our State. On November 18 the first annual meeting was held at St. Louis, in which it was stated by the Secretary, Mr. A. Reese, that forty-five members, ten life members and two patrons, Miss Julietta A. Owen of St. Joseph and Mrs. Wm. S. Haven of St. Louis, had been enrolled. This is a fairly good start, but considering the importance of the scope for our State, we must have ten times that number to do some good.

What is the aim of the society and how can it be attained? The aim is the protection of birds from unnecessary slaughter by hunters and shootists, many of whom think birds are created for them to give them the pleasure of killing. It is unfortunate enough that at this epoch of so-called advanced civilization there are still so many who find pleasure in taking life. The advocates of the hunt say that it is manly sport; that it makes man strong in body and mind and quick with the eye and hand. It was much more of such manly sport when the redskins whom we call savages went after their prey with bow and arrow, but with our modern weapons it is in most cases murder, pure and simple; and as for the strengthening qualities of a hunting trip I am sure that a man will get more health out of a stroll through fields and woods when he leaves his gun at home; and if he will only try, he will also get much more pleasure and instruction out of it, because his attention will not be absorbed by his eagerness to find something to kill, he will have leisure to enjoy the beauties of nature and will as an observer and friend become much more intimately acquainted with animal life than as a disturber and destroyer.

As it took generations to make people see the wrong in slavery, so will it take generations to induce all people to look at hunting from this point of view, but it is undoubtedly one of the aims of higher culture and will finally prevail in spite of all that is done and said by the defenders of the hunt, though their disciples are found in all walks of life, even in the highest.

In condemning hunting as a popular sport it is not meant that we should not kill those wild animals which damage our crops or are in any way injurious to our property or incompatible with our well-being and enjoyment of life. On the contrary the law of self-preservation makes it our duty to use all means to reduce their number or even exterminate them. The extermination of the rabbit would be almost as great a boon for the horticulturist as it would be to the world at large to get rid of the mice, rats, gophers, squirrels and prairie dogs. The damage all these rodents do far outweighs the benefit we derive from the little poor meat we find on them, and it would be foolish to demand their preservation simply for the fun of killing them.

It will only be a question of a few years when deer and wild turkey have disappeared from our State; this will be the inevitable result of the deforestation and cultivation of the country; they will go the way the buffalo, the puma, the bear and the wolf went. With the extermination of the smaller predatory mammals, such as fox, racoon, opossum, mink, skunk and weasel, it will require many years yet, but their entire removal from the State at the present time would not even be desirable inasmuch as we need their good services in checking the increase of rodents, which without them would become a real danger to husbandry.

Quails are still considered legitimate game, but, if farmers did understand what is good for them, they would long ago have stopped the killing of this useful bird, a large part of whose feed consists in such insects as do most injury to the growing crops, while the vegetable part of their diet comprises all kinds of seeds of obnoxious weeds and stray kernels of grain of no value to the farmer. Plovers and snipes are also of great benefit as insect destroyers, as anybody can convince himself by opening the stomach of one killed on his field or meadow.

All these birds should in the future be taken from the list of game birds, especially since it becomes more and more apparent that some species of plovers are already reduced to a stage where annihilation is threatened.

Of all the birds ordinarily hunted there are only the ducks and geese which could be recommended as legitimate game, and if the hunters would confine their efforts to these birds in the season set apart for their execution it would not do any particular harm as they are with us only a

short time of the year. But continued slaughter has reduced their numbers to such an extent that many a duck hunter does not even get the sight of a duck on his hunting expedition and, though exceptionally some true sportsman may in such a case go home without discharging his gun, the majority who go out not so much for the sake of obtaining food as for the fun of killing, will console themselves for lack of game by shooting at most any bird that comes within range of their guns. And even in the presence of game very few hunters can resist the temptation to shoot at any large bird or flock of small birds that comes within range. It is for such reasons that bird protectionists have to regard all hunting as more or less incompatible with their cause and landowners will do well to curtail the privilege of shooting on their property as much as possible. This will be an efficient way of checking wanton destruction of bird life, but as long as hunting without license is permitted in our State, it should be the special task of the Audubon Society to see that the present laws are obeyed. On page 182 of the Laws of 1895 it says in section 1: "It is further declared unlawful to kill any wild song bird or insectivorous bird at any season of the year, or to disturb, rob or destroy the nest of such birds, or take therefrom any egg or eggs. And any person offending against any of the provisions of this section shall be deemed guilty of a misdemeanor, and subject to a fine of not less than ten dollars nor more than fifty dollars." Approved April 8, 1895. This law protects a good many birds, but the trouble with it is that it does not provide means for enforcing it. Some states have paid game wardens to look after the enforcement of the law, but Missouri has not, and it should be the business of the Audubon Society to call the attention of our Legislature to this want.

But the worst is that not one in a thousand Missourians knows of the existence of this law, not even the officers of the law themselves. One of our first tasks would therefore be to make this law known throughout the State. Newspaper publicity would be very desirable, but the past apathy among many editors in regard to promulgation and enforcement of this law does not promise the best results. A simple and not very expensive method would be the distribution of cardboard posters bearing an abstract of the law and nailed up in every postoffice, every court house, every railroad station and possibly every school house of the State. After this first step the next would be to enforce the law in the neighborhood of cities through deputy sheriffs employed for this particular purpose. A few cases successfully carried through the courts and the guilty parties properly fined would have a most wholesome effect, since the newspapers would not fail to bring the interesting news, just the kind of publicity we want. Should the State laws concerning game and bird pro-

tection be changed, and they certainly need improvement, it would be best to adopt the most modern views in conformity with the latest results of food investigations by the United States Department of Agriculture, namely, to extend protection to all species and individuals of birds, excepting only ducks and geese, for which an open season from September 1 to April 1 may be provided, and of other species only such individuals as are found in the act of doing damage. A man must be allowed to protect his fruit or cornfield from the ravages of birds, if he so chooses, but it should not be allowed to kill such birds at other times in other places where they do no damage. For instance some crows and some black-birds rob the farmer sometimes of corn, while at all other times they are the farmers best help in keeping down the insect pests. Would it be right or reasonable to kill every individual of these species at sight? Certainly not. We raise in this glorious country over 2,000 million bushels of corn in ordinary seasons; suppose all corn-eating birds together eat 1,000 bushels, surely a high estimate, the loss would amount to one bushel in two millions, hardly worth considering and certainly only a small quantity compared with what is destroyed by the rodents in field and barn. This loss will increase continually, if we do not soon give the hawks and owls the protection which they need so badly. At present everybody kills hawks and owls, the farmer's best friends; this should be stopped. There is one species of hawk in Missouri who does nearly all the damage in the chicken yard and for his misdeeds all hawks are called chickenhawks and killed at sight without discrimination; nineteen times out of twenty it is the innocent, or rather the useful species that are killed, because the real robber, the Cooper's Hawk, comes and goes like lightning and seldom gives the gunner a chance to shoot. The same is the case with the owls. All our common owls, which are so unmercifully slaughtered by farmer and hunter alike are the greatest mice destroyers known and deserve our best protection.

And why should we continue to slay all the large birds, even if they should not be of any real pecuniary benefit? Is there, besides their economic value, no other reason why we need the birds? Does their aesthetic, their poetic, their artistic value count for naught until it will be too late for repair? Already most of the larger birds of beauty, the egrets, the cranes, the swans and pelicans are deplorably rare, and those of less striking appearance, the different kinds of herons and bitterns, the gulls and terns, the loons and cormorants, the plovers and waders, the larger woodpeckers and the kingfishers, in short all the conspicuous birds which formerly lent so much charm to the landscape, are getting scarcer and scarcer every year. Life in the country will be robbed of much of its pleasure

when all these birds are gone; and how monotonous it will be when one has to travel over miles and miles of land, through field and forest, without hearing or seeing any sign of life anywhere. Small mammals, may they be ever so plentiful, contribute nothing to the animation of a scenery; it is the bird that brings life into it, that delights the ear with its variety of notes and sweet songs, and pleases the eye with its beautiful plumage, elegant form, with its sprightliness and spirited activity, with its marvelous power of flight and the manifold and curious ways of feeding, courting, nesting, roosting and social gathering. If we were selfish and mean, we would say, there are enough birds here as long as we live; what do we care for the future; if it gives us pleasure to kill them, why should we not do it? Are not all creatures created for man, or as the small boy puts it: What are birds here for, anyhow, but to kill them; a few more or less won't make any difference.

Here is where a great mistake is made. Birds have their natural enemies and adversities and have had them all the time and they kept them from unnatural increase. Reproduction is slow; with few exceptions birds rear only enough offspring to preserve their numbers, replacing in summer those that die during the year. Every interference on the part of man reduces this number and, if continued, the inevitable result must be at first scarcity and finally extermination. That this is not a theory, but a fact is proven by the experience of European countries, especially England, where birds formerly common are not to be found at all any more; and when we look over the latest lists of birds of the New England States, for instance Massachusetts, we find repeatedly the melancholy annotation, "once common, now rare."

We owe it, therefore, to our children, to future generations, to posterity, to do all we can in protecting the birds as we find them now in our State; it is not too late yet, but it must be begun soon, and all must work together, all who have sympathy for our fellow creatures; all who are not entirely callous to humane feeling; all who would wish to hand down to posterity our country as beautiful as she is today; all who understand that love of nature makes better people, better citizens, happier beings. A true love of the beautiful in nature is an attribute of a higher civilization and should not only be fostered in the school room, but also in church and Sunday school. The clergy of every denomination should participate in this warfare against vandalism of thoughtless boys and heartless men; they should teach that taking of life is a serious thing and only excusable when necessity demands it. We know that somebody has to kill the domestic animals needed for food, but we have never heard that it is a very joyous task or made an object of sport and amusement.

The aim of the Audubon Society must therefore be to unite with the teachers in the school and in the pulpit in the endeavor to change the prevailing indifference, disregard and contempt for our feathered fellow-creatures into a sentiment of sympathetic interest and consequent friendship. With the children this effort will undoubtedly be successful, and future generations will not need Audubon Societies, but the present, I am afraid, can not be converted so easily and their education must in many instances go through the court room.

In a few states Bird days like Arbor days, and in connection with them, have been established or are advocated by Audubon Societies, but school days set apart for such a purpose easily degenerate into holidays without doing much good to the cause for which they are intended. I would recommend that the teachers say a good word for the birds as often as opportunity offers, and in this way have a bird day every day of school.

Last but not least, there is one more field of labor open for the Audubon Society. It is on the battlefield against the foolish fashion of women to adorn their hats with the dead bodies of birds. No laws can be enforced which forbids the wearing of birds or feathers; the only way to stop it is to prohibit their importation. State laws are effective enough to see that no American birds are used for this purpose, and if none can be imported, the dear creatures must ornament their sweet hats with something that can be obtained with less savagery and cruelty than the dead bodies of birds, which as a rule have not only laid down their own lives at the altar of fashion, but also that of their offspring, since nine-tenths are killed at the breeding period, leaving young to starve in the nest. The reason for this is that at the time of reproduction birds wear their best dress, the nuptial dress, which has the brightest colors and most resplendent lustre, and also because the birds which at all other times are too wary to allow approach, may easily be shot from the nest, since birds never desert their young ones, even in the face of danger.

Both importation and exportation of birdskins should be prohibited by Federal laws. Exportation, because, unable to sell their birdskins on this side of the ocean, the slaughterers would send them to foreign markets and nobody would be any wiser for it. We have already a law prohibiting the importation of live birds without special permission of the Department of Agriculture, and it is difficult to see why such a prohibition could not be made possible with dead bodies of birds or parts thereof.

It is to be hoped that our enlightened Congress will soon take steps in this direction, and if our country takes the lead, other countries will follow the example, and millions of bird lives will be saved thereby.

BIRDS AND AGRICULTURE.

(By August Reese, Secretary Audubon Society, 2516 N. Fourteenth Street, St. Louis, Mo.)

The important part that birds play in nature's economies, their relation to the Agricultural interests and the benefit mankind derives from their unrenmitting industry, has never received any manifest consideration from the public until within the past few years. That branch of the United States Department of Agriculture, the Biological Survey, which deals with this subject has accomplished great achievements for the enlightenment of the people on this all-important question, and is publishing pamphlets free for distribution, containing a wealth of information which ought to receive close attention, at least from those interested in Agricultural pursuits.

Statistics prove that bird life has decreased at the alarming rate of nearly 50 per cent. within the past fifteen years. The increase in noxious insects and its fatal effect on Agriculture has been in proportion to the decrease of birds. Dr. L. O. Howard, Chief Entomologist of the United States Department of Agriculture, estimates that we pay annually \$300,000,000 tribute to the insects and bugs, or one-tenth of all Agricultural products. Reports from all part of the country of the ravages of the Gypsy moth, grasshoppers, army worms, etc., are becoming more frequent and more appalling as years roll by.

The inestimable value of bird life to Agriculturalists can not be better illustrated than by the following report from the "Food of Nestling Birds," issued by the Department of Agriculture:

"Prof. Sam Aughey saw a marsh wren carry 30 locusts to her young in an hour. At this rate for seven hours a day, a brood would consume 210 locust per day, and the passerine birds of the eastern half of Nebraska, allowing only 20 broods to the square mile, would destroy daily 162,771,000 of the pests. The average locust weights about 15 grains, and is capable each day of consuming its own weight of standing forage crops, corn and wheat.

This case may serve as an illustration of the vast good that is done every year by the destruction of insect pests fed to nestling birds. And it should be remembered that the nesting season is also that when the destruction of injurious insects is most needed, that is, at the period of greatest Agricultural activity. The encouragement of birds to nest on the farm is therefore more than mere matters of sentiment, they return

an actual cash equivalent, and have a definite bearing on the success or failure of the crops."

To the loss of three hundred millions of dollars a year by noxious insects must be added the expenditure of millions of dollars for chemical compounds used in spraying, for sprayers, the cost of labor to apply these compounds, and very often heavy losses ensue from their improper applications: the consequent losses of all combined agencies, almost stagger human intelligence. Nature has decreed that birds shall check the ravages of insects. Silently and unbidden do they perform their task from early morn till late at night, in orchard, field and garden for the benefit of all mankind. Instead of being encouraged, they are persecuted and driven from their field of activity. The war of extermination against our feathered friends is raging with more determination than ever. In some sections of this country, and Missouri is no exception: where birds at one time were marvelously abundant there is now only a vague impression of their former multitude. What remedy is at our disposal to check this indiscriminate slaughter of birds? The fundamental principles of practical bird protection are effective bird laws and their *enforcement*. To obtain these results, the Audubon Society of Missouri was incorporated August 13, 1901. We appeal to all public spirited citizens to assist us in our efforts by becoming members. Only by united and concerted action can we succeed. The officers of the Audubon Society devote their time and services gratuitously. Wholesale milliners, bird and game dealers and others financially benefitted by bird destruction have so far been successful in defeating practical bird legislation. This outrage must not occur again. The Audubon Society will present to the next Legislature comprehensive and effective bird laws and we trust that the Agricultural industries will insist upon their Representatives and Senators to support and vote for such a bill.

Zinksgarten Str. 14, Halle of Saale, Nov. 3, 1901.

Hon. L. A. Goodman, Secretary State Horticultural Society, Kansas City, Mo.:

Dear Mr. Goodman—After a two months' trip through the fruit districts of Europe I have located here at Halle for a year's study in the University. I have chosen this place for several reasons. The University has one of the best Agricultural Departments in Europe, being well manned and well equipped. It is also centrally located, in one of the richest agricultural regions of the continent, and is for that reason a convenient place from which to make excursions into the various fruit, vegetable and flower growing districts to study practical operations, markets, etc.

I regard these excursions as being of even greater importance than the University study itself. It is, however, highly desirable to make the University a base and to get acquainted with the University and Experiment Station men, so as to secure the benefit of their knowledge and experience in planning excursions and in securing access to the places and things that one most wishes to see. However, the University work is itself most excellent. In many respects they excell us in America. In addition to getting better acquainted with the language and the Horticultural literature of the country it is of great value to become acquainted with their laboratory methods, methods of conducting experiments and to study their Agricultural and Horticultural instruction in comparison with our own.

So far as fruit growing goes, it is everywhere evident that the Germans greatly fear American competition. They admit that they cannot produce canned, preserved, dried and evaporated fruits that can compete with the low priced American product. The only opportunity left to them in this field is to produce a very superior article, regardless of expense, and to sell it for a big price. It is eventually consumed by those who are willing to pay a big price for the best article. They also find it more profitable to grow varieties of the highest quality than to plant for largest yield, as they can get fancy prices for the best fruit, wrapped and shipped in small baskets.

They laugh at the low grade of American fruit, whether green or preserved, and fraudulent practices in American fruit dealing are a standing joke in Horticultural circles. When a thing is small in the middle and big at both ends, or fine looking outside and bad within, it is likened to the American apple barrel.

It seems to me we ought to make a point of supplying only a first-class, honest product for the European trade and if we do it, it will go farther than any other one thing toward enlarging our fruit trade abroad.

I never before realized how much I would miss meeting with the Horticultural Society. If every fruit grower in Missouri could realize what a good thing those Horticultural meetings really are, as thoroughly as one can when the ocean separates him from them, they would be packed to overflowing until a special pavilion would have to be constructed to hold the crowd.

I have attended numerous fairs and horticultural exhibits over here, and while the fairs themselves were good, I continually found myself getting a trifle homesick through failure to see a single face that reminded me of the Missouri Horticultural Society. I would have given more to see a single plate of Ben Davis, with Evans, Goodman, Murray, Miller, Robnett or Nelson sampling it, than I

would to have been the proud possessor of the fruit belt of the Rhein.

I hope this has been a prosperous year for the Missouri fruit growers, and that the Winter meeting will be the best one in its history.

Very sincerely,

J. C. WHITTEN.

Mr. Atwood: Mr. President, Ladies and Gentlemen: You know that Prof. Whitten has been thinking of you today. Now let us send him a greeting.

"Letter read as follows:

To Prof. J. C. Whitten, Halle on the Saale, Germany:

The members of the State Horticultural Society in convention assembled send friendly greetings and best wishes to you and yours, in your temporary sojourning place, in a distant land. Accept our heartfelt wishes for your success in gleaning from the rich German stores of experimental and scientific horticulture.

We feel that your gain will be Missouri's gain; knowing you to be with us and for us. A welcome home awaits you at our next annual meeting.

Presented and passed unanimously at St. Joseph, Mo., December 5, 1901.

N. F. MURRAY, President.

L. A. GOODMAN, Secretary.

Motion made and carried that the above letter be signed by the President and Secretary and forwarded.

Mr. Evans then offered the following resolution: Said resolution was adopted:

"Whereas, The Missouri State Horticultural Society will be expected to take an active part in the coming Louisiana Purchase Exposition, to be held at St. Louis in 1903; and,

"Whereas, The time is now at hand that steps should be taken looking to the making of a complete and grand exhibition of the horticultural products of our State on that occasion; therefore,

"Resolved, That the Executive Committee of this Society are hereby instructed and empowered to take such steps as will in their opinion insure successful results.

Prof. Dutcher: I want to offer a resolution for the birds.

"Said resolution as follows was adopted:

"Resolved, That the Missouri State Horticultural Society, believing in the aims and purposes of the Audubon Society of Missouri in its work for the protection of the birds and game of this State, endorses that society and pledges it its earnest sympathy and moral support."

St. Louis, Dec., 10, 1901.

Mr. L. A. Goodman, Kansas City, Mo.:

Dear Sir—It affords us great pleasure to learn that the Missouri State Horticultural Society endorsed the work of the Audubon Society, and pledges its support. Heroic measures must be adopted to have laws enacted that will positively prevent the extermination of wild bird and animal life. Those opposed to it, milliners, game dealers, market and plume hunters have been successful so far, by the use of money to prevent effective bird legislation. Enclosed please find membership card. Accept our sincere thanks for your active interest in our cause. Yours to command,

AUGUST REESE,
Secretary.

COMMITTEE ON FINAL RESOLUTIONS.

To the Officers and Members of the Society:

Your Committee on Final Resolutions would report as follows:

The Missouri State Horticultural Society, in session at St. Joseph, express their hearty thanks to the people of the city for the cordial welcome tendered them through their mayor, Mr. John Combs; to the young ladies and gentlemen of the city and vicinity for the literary and musical numbers so much enjoyed by us; to the visiting members of other State Societies for their presence, and very helpful part they have taken in our program; to the St. Joseph Horticultural and Agricultural Society for decorations and elaborate furnishings of this spacious hall which have tended so much to our comfort and pleasure and to the newspapers of the State at large for the interest taken in our society, and to the papers of the city, in particular, for the generous notices of the daily meetings of the present session; to each and all of the railroads of the State that so readily granted a fare and a third for the round trip, and assure them that we patiently await the time when their increased interest in fruit-growing along their lines will induce them to as readily grant one fare for the round trip from every station in the State; when they shall realize, as we do, that a more general planting of fruit trees throughout the State will conduce to a greater consequent improvement in the condition of the farmers, and this in turn add much to the business of the roads themselves.

G. W. HOPKINS,
J. M. IRVINE,
C. H. DUTCHER,

Mr. Jones: I feel as if I must speak a word at this time. I have been attending Horticultural meetings and visiting fruit lands from Winnebago to the Gulf of Mexico, and I feel that it will be nothing more than proper, to say a word in regard to this magnificent fruit display. I think I never saw anything, not even the exhibit at the World's Fair, that seemed to fill me with so much enthusiasm for fruit growing. I have heard it said in many places that Missouri could raise good Ben Davis apples, but that was all. I wish that every man who ever made that remark could witness this magnificent fruit display, and taste these most excellent apples. I believe Missouri has wonderful possibilities. I attended your State meeting last year and this year, and I feel like the old lady who said that she had attended over one hundred 4th of July celebrations, and the last one was the best. I feel like I could attend one more.

Mr. Hopkins: I move a vote of thanks be tendered to our retiring President for the faithful discharge of his duties during his term of office. Carried, unanimously.

President Murray: Ladies and Gentlemen—I certainly appreciate the vote that you have given me. I have simply tried to do my duty as President of the Society, and to the best of my knowledge I have done everything in my power to promote the interests of pomology throughout the State of Missouri.

I think it is only right and proper that I should say here, that I had the pleasure of attending, as a delegate of your Society, the meeting of the American Pomological Society that convened at Buffalo, New York, in September, and while it was a pleasure (because it was a trip to a part of the country that I had not seen) it was something of a disappointment. We had delegates there from thirty different States and from Alaska, but I would rather spend three hours here, or one session here, than all the sessions or two days at the great Pomological Society of Buffalo, New York. If you had been there you would have said the same thing, that you could learn more here and see more than we did at that meeting.

At that meeting the Ex-Commissioner of Pomology of Washington City, Mr. Van Deman, gave it as his unsolicited verdict that the State Horticultural Society of Missouri, (and I believe he is a gentleman quite well acquainted with all the State Societies throughout the Union) was the best and most practical working State Horticultural Society there was in the United States.

Now, ladies and gentlemen, I have no time to make a speech. I want to say this in conclusion. We have been doing well in the past,

we are doing well now. I have been attending these meetings for some twenty years, and while they sometimes laugh at us for saying the last meeting was the best, I am sure that never in the history of the Society, since I have known it have we had so large a display of fine fruit as we have here now, although it was a dry and unfavorable season. I am sure we have never had all parts of the State represented by practical and intelligent and enthusiastic fruit growers as at this meeting, nor ever have we had so many intelligent fruit growers visit us from the surrounding States.

I thank you for the attendance and the attention given, and while we have done so well, and while we are doing well, let us not be content with present attainments, but let us unite our forces and march onward and upward to a higher plane for greater usefulness, until we shall obtain for the State of Missouri, as a fruit growing State, the very highest pinnacle in the American Union.

Major Holsinger: I attended the fruit exhibit at Buffalo and I must say that this beats that display. I have examined all of this fruit, having been Chairman of the Committee on Fruit. These Apples are perfect. There is hardly a plate on the table that isn't in perfect condition, smooth, free of fungus and free of insects.

Mr. Evans: I think enough has been said and enough time taken up, but I will just say, as well as I remember, I think this is the 43rd annual meeting of this Society that I have attended, and I want to say this is as good as any.

Mr. Irvine of St. Joseph: We have been 43 years, according to Col. Evans, in getting up to this place. The last time when the Society met here a gentleman made the prediction that the price of grapes would not go below ten cents a pound. We now consider ourselves lucky if we get ten cents a basket. But now since we have had such a good meeting here let us have it every winter.

Mr. Baxter of Illinois: I would like to remind all the ladies and gentlemen present that our Society meets next week.

I have been a member of this Society for several years. I like to come here and I learn something, but at the same time I wish to say we have a very progressive Society over there in Illinois. I believe you can learn just as much over there as I can here. Now you have a magnificent display of fruits. We have a magnificent display of fruits over there. Now then we will meet you in friendly competition in St. Louis in 1903, as we did in Paris last year, and we will not take a back seat either.

Mr. Marshall, President of the Nebraska State Horticultural Society: I wish to say a word. I would say this is the best display

I ever saw, but Wilson is so close here I don't dare say it, because they had one up there that I heard him say was better than this; but I will say that this is one of the best displays. That one was a good one at Council Bluffs, but if that one was better than this one, I have forgotten it. I believe that this is, in my memory now, the finest show I ever saw.

Now I don't live in Missouri. If I did I would say it was the best country on earth, but I don't live here. I came down here to be shown, and gentlemen, I have been shown. I have been entertained and pleased, and I don't know but what I will attend your meeting at Springfield next year. I invite you, one and all, to come and see us, and to attend our meeting, and we will try and make you comfortable.

Mr. Wilson of Iowa: Mr. Marshall, my friend from Nebraska, really made my speech, with the exception of his reference to our display of apples that we had at Council Bluffs in the Horticultural meeting. Mr. Marshall didn't understand me, I guess to-day. I said we had more apples—I think we had 160 bushels of apples on the tables there.

I must say, gentlemen, in all candor and fairness, that it has been a great pleasure for me to meet with you people and see what you are doing. Your display of fruit here is highly creditable to any State. I don't blame any Missourian for being enthusiastic. It is your duty to be enthusiastic, and you have a good fruit country, and you have an active and live Society, and as our friend, Mr. Murray, said awhile ago, I believe you can improve this condition here very much in my judgment. You have had more experience. You are more fortunate in climate, and all those things and you ought to be enthusiastic.

I can say I never was at a meeting where there was more practical and interesting discussion than you have had here, and that is the life of any Horticultural Society. I thank you very much for this cordial greeting.

Mr. Butterfield: I will say I am very glad to come and glad to hear the last talks, but there is one thing that has not been said, that is very important, and I see that there is no one else going to say it, and I don't want to miss it, and that is, we have two of the best papers in the world published in Missouri. I speak now of the *Western Fruit Grower* of St. Joseph and the *Practical Fruit Grower* of Springfield, and I want every one in this house—I don't care whether he is a farmer or fruit grower or merchant, to subscribe for these papers. I am satisfied that there are fruit growers near St. Joseph, that are not taking these papers and they should take them. I thank you.

Mr. Tippin: I just want to speak a word to the citizens of St. Joseph. In anticipation of the winter meeting being at Springfield next winter, I want to urge every citizen of St. Joseph, that possibly can, to attend that meeting, whether as a delegate or not, for we want an opportunity to return the cordial reception that you have given us, and assure you if you will come down to South Missouri, that you will come back feeling happy that this great State has a southern side.

Thereupon the convention adjourned.



FRUITS AND CULTURE.

SOME REQUISITES OF SUCCESSFUL APPLE CULTURE.

(George T. Powell, New York.)

One of the most promising industries for the future is that of apple culture, when we consider the subject of specialties in production. While there has been an enormous increase in the planting of apple orchards, yet the demand for this most excellent and standard fruit has kept fully apace with the supply.

IMPORTANT REQUIREMENTS FOR SUCCESS.

First of all is the selection of good and suitable soil. The heavier loams are most desirable, and if some clay enters into their composition it is quite valuable for the keeping quality of the fruit. Avoid the sandy loams for they are better for peaches and cherries. Choose well elevated positions for orchard sites rather than low bottom land. These afford better natural drainage, while the circulation of air is also better and there is less danger from frost when trees are in or just out of bloom. The cold air on frosty nights will roll down from the hills into the valleys, the same as water will seek the lower levels. There is also an advantage in the highest elevations from the fact that the winter temperature does not fall so low.

The soil should be under cultivation to corn or potatoes one year previous to setting the trees. This gives the best possible condition of the soil before planting. Give ample space, 35 or 40 feet distance between rows, according to the variety. Double plant with early bearing kinds for fillers in the spaces which will bear for several years, adding largely to the profits of the business, and when these begin to crowd upon the permanent trees they should be cut out. This advice is given cautiously, and the plan is recommended only to those who have backbone enough to cut out these fillers when it is necessary to do so.

Good trees having been selected, the management, after planting, becomes highly important. In a large majority of instances, clean cultivation of the soil will prove better. To the want of cultivation more than any other cause may be traced the great amount of inferior fruit that is found in our markets. In most uncultivated orchards seldom above 20 per cent of strictly fine No. 1 apples can be barreled; 60 per cent will run No. 2, while 20 per cent will be unmarketable. Where cultivation is given, it should be done by plowing very lightly

at the earliest opportunity in the spring, then keep the ground frequently harrowed up to July 10 or 15, when a cover crop should be sown for the good of the soil and of the trees during the winter months.

MARKED RESULTS WITH CRIMSON CLOVER.

I have used with great success crimson clover for this purpose. This is an annual plant, grows quickly and will make a better cover than the common red clover when sown as late as the middle of July. When crimson clover will not thrive, Canada peas will do well and be of value. The renovation or improvement of the soil through the use of clover or peas may be obtained very economically. I believe it is possible to continue and to increase the productions of the soil for generations to come, and by the aid of the clover and other leguminous plants to add more nitrogen than will be taken from the soil by the crop grown. The following analysis was made of the soil in one of my pear orchards after three crops of crimson clover had been grown and plowed in, the orchard producing at the same time three successive crops of pears, without other fertilizer being applied. One sample of the soil was taken six inches deep, in the orchard, and one from the same kind of soil near by and adjoining, where no clover had been grown for three years:

INFLUENCE OF CLOVER ON FERTILITY.

	Three crops clover, per cent.	No. clover, per cent.
Water	15.00	8.75
Nitrogen .....	.21	.12
Humus	2.94	1.91
Phosphoric acid, available .....	.015	8.75

The water content was determined after the soil samples had dried for three days in a shallow dish in a warm room. The difference in water of 6.25 per cent makes 46.875 tons per acre, in nitrogen of .09 per cent makes 1,350 pounds more per acre, and in phosphoric acid of .007 per cent makes 105 pounds more per acre. It would have cost to purchase 1,350 pounds nitrogen at 15 cents per pound, \$202.50 per acre, yet the clover seed for the three years cost but \$3 per acre. The seed was sown when the cultivation of the orchard ceased, about July 5 to 10, and was lightly covered with a smoothing harrow.

There is a limit to the extent to which it is wise to use clover or peas as a cover crop, as too much nitrogen will affect the keeping quality and the color of the fruit, the effect being to prolong the maturity of the fruit and cause red apples to take on a lighter color. After a

few years of the use of these cover crops rye can be substituted in their place. I firmly believe that by an intelligent use of these cover crops that all long cultivated soil may not only be economically restored and improved, but that greater production can be obtained than ever in its history.

CONDITIONS AFFECTING FRUITFULNESS.

(*By Prof. E. S. Goff, University of Wisconsin.)

In pruning we have most to learn, and here I must introduce two principles, to which I have not before alluded, viz.: that plenty of light is absolutely necessary to the formation of flower buds, and that the more a branch tends to the horizontal the more likely it is to form flower buds. We should, therefore, favor horizontal branches, and discourage vertical ones, with the exception of the leader. We should insist on the growth being distributed over a large number of branches and should promptly pinch, in early summer, all shoots that incline to grow more than a foot long. We should promptly rub off all superfluous shoots. This means that we must do much summer pruning, and in some cases, we must do less early spring pruning.

BUD THE UNIT OF PRODUCTION.

To make this subject clearer, I will introduce in conclusion what will be to most of us a new conception of the cultivated fruit tree. We have been accustomed to regard the fruit tree as the unit of production in the orchard. But the tree is a composite and intricate organism. It is more just and tends to simplify our conception of the proper methods of treating the orchard to consider the bud as the unit of production. The buds of a fruit tree are in a sense distinct organisms. They are separately born. Each has a definite and distinct life history. Its mission is to grow for a time, to produce other buds by division of itself for the perpetuation of the trees, and finally to flower, to fruit and then to perish.

From this point of view the fruit tree represents a crop of buds, or, more accurately, two or more crops of different ages. Each season one of these crops of buds finishes its course by flowering and fruiting, and another crop is brought into existence to take the place in due time of the crop that has fulfilled its mission. Now the fruit grower's problem is easily stated. It is to so treat his trees as to have the largest number of buds in condition to fruit to their best capacity each season, and at the same time to bring on other healthy

buds to perpetuate the life of the tree, and to fruit the next and succeeding years. If his tree is not yet fully grown, it is imperative that the crop of young buds that he brings forth shall be larger than the crop of buds that he permits to fruit. Barring only the question of winterkilling, if his methods of culture are correct, there would seem to be no more reason why he should fail in having his crop of flower buds ready to open each spring than that the nurseryman should fail to have a crop of salable trees ready to supply his patrons.

Let us carry the comparison between the fruit tree and the nursery farther. We should at once condemn any system of nursery practice that permitted a few of the strongest trees to crowd the majority of the weaker ones out of existence. But is not such a system going on in most American orchards today? The majority of the buds in many, if not most fruit trees are starved or smothered out of existence by their stronger neighbors, while the weaker buds, in turn, harass their stronger neighbors to an extent that largely interferes with their fruiting capacity.

The conception of the bud as the unit of production is not wholly new, though it will be new to many American fruit growers. In Europe the fruit tree has long been cultivated more or less from the standpoint of the bud. But the pottering methods of training and tying fruit trees practiced in European gardens are impracticable in our land of high-priced labor and extensive culture. And yet the bud standpoint is unquestionably the correct one. What, then, can we do? We must make an economical compromise between their slow and tedious methods and our happy-go-lucky no-system. We must find a way of pruning our trees so as to better control the growth and to place the buds more on an equal footing as regards light and space. Then, with our improved spraying methods, we should be able to place our fruit crops on a much surer basis, and to grow fruit of much higher average quality.

*Concluding installment of paper read before Wisconsin State Horticultural Society.

HINTS TO TREE-PLANTERS.

(By Jonas H. Priest, Middlesex County, Mass.)

Editors Country Gentleman—As the tree-planting season draws near, all persons who intend to plant shade or fruit trees should inform themselves what varieties of trees to plant, and how to do the

work, so as to make it a success. All varieties of trees are not well adapted to the same soil or location. All winter-keeping varieties of apples, for instance, need a moister soil and a cooler location than the summer or early fall varieties.

Now, many persons are not aware how much depends on the way trees are planted. It is not unusual to see men plant trees very much as they do a cabbage plant, making a hole in the ground just about large enough to take in the roots, without straightening them out or placing them so as to make the tree strong when it has grown up and come to fruit-bearing. Three years since, one of my best-appearing Baldwin trees was blown over by a heavy wind, and when I came to examine the cause of it, I found that all the large roots were on one side of the tree, proving very clearly that when it was planted the large roots were not equally spread out, so as to support the tree on all its sides. The tree had grown to about a foot in diameter, with scarcely any wind protection on one side.

One person alone cannot very well plant a tree, for some one should hold the tree in place while the more experienced person places the roots and fills in around them the fine loam. No manure or fertilizer of any kind should ever be used around the roots when planted. If trees are properly planted, they should make some growth the first year; but they will not do so if the hole dug is so small that the roots cannot be properly placed, and find some soft, fine loam to feed upon. Then the holes should be dug deeper at the outer edge than in the center, so that in placing the roots, the ends will point down ward rather than upward. When trees are properly planted, the land can be cultivated with the plow or harrow without disturbing the roots, and the trees will make a much more rapid growth than if planted in ground not cultivated.

A friend of mine at Sandwich, N. H., about twenty years ago planted an orchard of about fifty Baldwin trees. He cultivated the land for a few years, and then seeded it down to grass. The same year, one of my friend's neighbors planted a much larger orchard, of one thousand trees—five hundred of Baldwin and five hundred of Talman Sweets; but he did not cultivate the land, and the trees made a very slow growth, and many of them were killed by the borers. Two years ago, my friend wrote me that he had more good fruit on his small orchard of fifty trees than his neighbor had on his much larger orchard of nearly twenty times the size.

Now, if there is any truth in the adage that "as the twig is bent, the tree's inclined," then there is equal or more truth in the statement that on the way the tree is planted, cared for and pruned for the first

ten or more years after planting, will its beauty and fruitfulness in later years depend. Young trees usually need some pruning as soon as the second year after planting, but all that is needed to do that work is a strong, sharp pocket-knife, and if that is properly used, more or less, as the trees need it every year onward for a few years, there will seldom, if ever, be any need of such severe pruning as has been advised by one or more of your correspondents during the past few weeks.

No man should ever attempt to grow fruit of any kind who is not willing to take as good care of his trees as he does of any other crop he grows. If he is ignorant of such work, he should in some way try to inform himself, as there is usually some way to learn the best methods of doing all kinds of work.

INFERIOR TREES EXPENSIVE.

(By Albert Brownwell, Northwest Horticulturist.)

It costs more to produce a good article than a poor one, and in buying, the first question should be, not how cheap, but how good it is. Many people understand this well enough, and yet how few ever stop to apply the rule to nursery stock. In no other kind of purchase is the quality of the article of such vital importance as in nursery stock.

The price of a tree is the smallest part of its cost by the time it has come into bearing. If a man buys cheap trees to save a few cents on each, by the time the trees come into bearing the expense of the land, labor, etc., has amounted to several times the original cost of the trees, and consequently if his cheap stock turns out as it uniformly does, to be of inferior and worthless varieties, then it is a serious loss to him, and he has to begin all over again.

Now, is it not plain to all that it is rank folly for anyone to risk this dead loss of trees, use of land for years, expense of cultivating, etc., to save a few cents on the tree, when for a trifling increase in price he can get the very best warranted stock?

As a mere matter of insurance a man cannot afford to buy anything but the best, warranted nursery stock.

It is a general rule, which can be relied on that "cheap" stock is worthless stock, and therefore dear at any price. If a man won't pay for good stock, but buys cheap stock in order to save money, he is very sure to lose all he puts into it. Most of the worthless stock

is worked off by strange agents, who sell on their own account, and are not authorized by any responsible firm to take orders for them. Such men buy up refuse stock from large nurseries for almost nothing, and fill their orders with it, claiming it to be good. They also frequently warrant the stock, but as they are unknown or irresponsible, their warranty is absolutely worthless.

If people would buy only from agents who can show a certificate authorizing them to represent a responsible firm, there would be no danger of being cheated.

WE CANNOT GET SOMETHING FOR NOTHING.

This is not a world where we can get something for nothing, and where an article is offered at an extraordinarily low price, there must be some good reason for it.

The very simple reason is that as the article is of bad quality it cannot be sold in competition with first-class goods, and is therefore necessarily worked off on the public at a low rate to catch those people who will bite at anything cheap, without regard to quality. Such people never get ahead, because they waste their money on poor trash that gives them no "value received" for their outlay.

FALL PLANTING OF FRUIT TREES.

(By A. T. Erwin, Iowa.)

The dormant season of plant growth is now coming on, and the farmer who is planning to add to his fruit plantation is likely to be confronted with the question of fall or spring planting. It is well known among gardeners that a soil temperature some degrees above that of the atmosphere stimulates root growth, hence we have the practice of bottom heat for the rooting and establishment of cuttings and repotted plants. In fall we have natural conditions which are essentially those of a bottom heat. Throughout the summer the earth is cooler than the atmosphere. In fall the conditions are reversed and the earth is the warmer. Hence, in this respect, we have an ideal condition for transplanting work, and a factor, which does not exist in our favor at spring time. Again, in fall there is more leisure for such work, there are not apt to be delays on account of wet weather as in the spring. If the work is done sufficiently early in the fall, the tree becomes partially established before winter, and hence has an earlier start for its work the following season. So much, then, in favor of fall planting.

One of the serious drawbacks to orcharding in the northwest is the fact that the trees are root tender. Subject to the intense cold accompanied by the drying winds of the prairies the tree gives away at the weakest point, and that point is often in the root system. Varieties which seem hardy in trunk and bud are root killed. Now it is evident if we are confronted with the problem of root killing, and we certainly are in the northwest, the plant that has been disturbed just before the opening of winter is the one most likely to suffer. In this connection it is interesting to note that within the past few years the practice of storing stock in cellars has become very general among the nurserymen of this territory. One important advantage of this plan is the guarding against loss by winter protection. In the memorable winter of '98-'99 the nurserymen of Iowa lost thousands of dollars worth of nursery stock through the lack of these facilities.

So if you are above the 41st degree of latitude and in the northwest territory, I should in general certainly advise spring planting. Even if the planting is delayed until spring there may be advantages in receiving your stock in fall. In spring the nurserymen are always rushed, and frequently it is late in the planting season when some of the orders receive their turn for filling, while if your stock has been delivered in fall and buried in some convenient spot, it is there and convenient at the opening of spring. Fall delivered stock should be buried in a trench on some sloping ground, placing a layer of trees and then one of soil, and a final mounding over of both root and top with earth. Thus stored, your trees are protected from the drying winds, sudden changes of temperature, rabbits, and will pass through the winter in good condition. If you do not care to take this extra trouble of storage, leave them with your nurseryman until spring—he should have proper facilities for their keeping, and is responsible for their delivery to you in the spring in good condition.

Briefly recapitulating, south of the 41st degree of latitude, and east, in a favorable season, fall transplanting can be recommended, but in the northwest bury your trees until spring or do not receive them until that time. Exceptions should be made to this statement in the case of evergreens. These do not store well in trenches, and should never be received in fall.—Orange Judd Farmer.

HOW TO GROW APPLE AND PEACH TREES.

Prof. W. L. Howard, of the Missouri State Agricultural College, one of the Greene county young men who has won honors at Columbia, has been doing good service as one of the lecturers at the Farmers' Institutes in this State. At the recent institute at Chapin he explained "How to Grow Budded Apples and Peaches With no Out-lay." He said in part:

"Plant the seed in a box in a layer of sand about one inch deep, then cover about one inch and set on the north side of a building, where the rain will keep the moisture. This, with the action of freezing, helps germinate the seed. This should be done in the fall. In planting in spring put the seed in a rich garden soil, deeply plowed and well prepared. Seeds should be one to two inches apart. Thoroughly cultivate through the season, dig in the fall, before the ground freezes and keep in green sawdust, oak being the best. The root in which the graft is put is called the stock, the graft is the scion. Stock should be put in bunches and packed in sand until February.

Select from desirable trees the different varieties you want and cut the graft or scion at the ring of last season's growth.

In the process of grafting use only a sharp knife and in cutting stock or root make a smooth cut of about an inch slant. Where you have just cut split the root down and with scion repeat. Both root and scion must be even on one side, as there is where the union takes place. Bind with light string four or five times. This is what is called root graft. Do it in February and store in sawdust in bunches of about fifty where they will not be shaken or disturbed. Take up carefully and plant in well prepared ground about garden time and plow deep and possibly subsoil. Harrow well, line up rows with a string and mark with a sharp stick. Put them in straight rows six to eight inches apart and cultivate well. When one or two years old, two years old preferred, set out in rows about 25 feet apart. Cut roots to six inches in length, all but tap root. Cut top one year old trees back. On trees two years old leave a leader, for it will have branches. Head tree to suit anywhere from twelve to eighteen inches from the ground and trim branches from within two inches from the trunk. If it should fork cut out one fork, as when older and heavy with fruit it will split. After planting cultivate as you would farm

crops. Prof. Howard says that corn, potatoes, berries and cowpeas can be grown in an orchard, these being preferable to all. Bud peach trees late in summer along in August, or when the bark peels well. Put the bud in as low as possible, two or three inches from the ground and cut high enough so the bud will not be affected by the part dying. Select budding sticks from trees that are known to be healthy. Plant after one year's growth. Cut off all side branches to about one inch, and cut top back.

The best varieties of peaches and apples for a commercial orchard are those in demand by buyers. Ben Davis, Gano and Jonathan. For a home orchard York Imperial, Red June, Early Harvest, Huntsman, Grimes' Golden and White Winter Pearman are the best varieties. For commercial peaches Elberta, Champion, Heath Cling and Salway are the most sought, while for home use the Family Favorite, Mountain Rose and Early Alexander are the best peaches to grow.

Diseases and insects that often attack peach and apple trees can be overcome by spraying with the Bordeaux mixture. Borers may be prevented by putting shingles around the tree or wire screen. There are two kinds of borers, the flat head and the round head, the one above the ground is called flat head.

Experiments conducted by the government fruit stations after experience with four years' growth conclude there is no difference in the growth and vitality of a tree, whether grown from whole root or piece root graft and that whether nursery stock is called whole root or piece root."—Practical Fruit Grower.

CROWDING APPLE TREES TOGETHER.

(By Edwin Hoyt, Connecticut.)

You will find it very difficult to gather statistics of an orchard, at the present day, that will give anything near what we may expect from one that is properly cultivated, fertilized and sprayed. I think, however, that in a few years there will be typical orchards bearing when statistics may be had that will startle many of our farmers by the large yields and profits obtained from them. From what I have seen and learned, I am satisfied that apple trees of many varieties may be brought into full bearing at four years after being set into the orchard. I have seen apple trees the fourth year after planting out, bear one-half bushels of apples per tree. I once saw an orchard here in which ninety trees bore, the eighth season after being set into the orchard, 206 barrels of picked apples. These ninety trees were composed of Baldwin, Rhode Island Greening and Roxbury, and were set eighteen

feet part. I am not an advocate of large apple trees with tops spreading thirty to thirty-five feet, and going up into the air twenty-five to thirty-five feet, requiring a thirty-foot ladder to gather the fruit, but prefer to set my trees eighteen feet apart, using 135 trees per acre, and when the trees are four years old and come into bearing, stop all other cropping and let the trees have all the ground to grow and mature their fruit. I would, however, fertilize and cultivate the orchards as I would for any crop.

By setting the trees eighteen feet apart I have 100 trees more to the acre to bear from the time they are four years old and on. This makes the orchard itself pay a good profit for the land, and there is less reason or desire to crop the land with some other crop, as would be done with only thirty-five trees to the acre. These trees would bear for fifteen years before crowding, when the top of every other tree should be cut back to as near the body of the tree as could be done, and not leave the limbs too large; the same as would be done if the tree were to be top-grafted. A new top of young thrifty growth would start out, which, of course, would need to be thinned out properly, and in three years, the trees would be in full bearing again, when the tops of those not cut back may be served in like manner. By this method of treatment the top would be kept young; the fruit be grown on young and thrifty wood, and the apples easily picked and trees easily sprayed over those low heads. When the trees crowd again, let the tops be cut back as before, or take out every other tree entirely. As money from the orchard is the object, thus planting the trees 135 to the acre and keeping the tops within a radius of about sixteen feet, more apples will be taken from the orchard in twenty or twenty-five years, and at less expense per tree, than would be from the same ground with trees set thirty-five trees to the acre, in fifty years, for there are 100 more trees per acre to bear fruit, and on thrifty, vigorous, young trees.—*Rural New Yorker*.

GROWING TREES TO WITHSTAND DROUGHT.

(Charles E. Richards.)

It has long been noticed how much better deep-rooted trees and growing plants stand a drought than those which are shallow rooted. The tendency to root in any particular way is largely an inherited characteristic in the various varieties of trees or plants, but partly a matter over which man has some control. There are conditions in which moisture is so frequently supplied by rain, or where the

water from below comes so near the surface of the ground, that it is impossible and unnecessary to try to make the trees root deep. There are no fruit trees so far as I know, and but a few kinds of nut-bearing trees, which do well if their roots extend to a perpetual water strata. But on ordinary soils, and under usual conditions, trees may be so pruned and trained that they will send their roots deep down, and the deeper rooted the trees become the healthier, the longer lived and the more productive they will average.

The trees from the same nursery, on the same kind of root, if planted in California will stand a drought which would kill its fellow planted in New Jersey, with its ordinary root system. This fact leads me to inquire if there is not some way by which trees may be induced to root more deeply. The chief cause of the difference is that in California the soil about the orchard trees is kept well cultivated, and each wet season the ground is deeply plowed, thus all the surface roots and rootlets are cut off. The moisture during the growing months is supplied by a deep furrow system of irrigation, so the water is sent well down into the ground and the roots have no need to come to the surface for water. Indeed the top soil is kept so well cultivated that there is always a dry layer of earth of several inches in thickness, which prevents the radiation of moisture.

From experiments which have been made in the East it is possible to force the roots to go deeper than were nature let alone, and always, so far as I have investigated, has the experiment been attended with satisfactory results. If the main roots of a young nursery tree are pruned square across a number of small rootlets immediately start near the point of amputation, and their growth is usually at right angles to the root from which they originate. Now if in place of a square cut, a fresh very oblique cut be made, the tendency is for a single main sprout to grow, and in the same direction with the root from which it started. It is evident if this rule holds true, that a deeper rooted tree can be obtained by pruning the top root or roots in this manner. The side roots should be similarly pruned and the oblique face of the cut turned downward. Then if in addition to the proper initial root pruning, the orchard be plowed and cultivated, if not as frequently as is the custom in California, at least once in a while, so as to cut off the surface feeders, then the tree will depend more and more upon its deep roots. It would not be well to allow too long an interval to elapse between these root prunings for the removing of a considerable quantity would be a severe shock to the tree. Better do it often.

Deep rooted trees do not respond as quickly to fertilizers, but on the other hand they do not make known a want as quickly. There are always a sufficient number of small roots to take in the food or water, and the fact that there are none of these upon which the tree largely depends will be a guarantee that year in and year out the deep root system is best. The experiment is well worth trying.—Orange Judd Farmer.

ORCHARD METHODS.

Prof. John Craig of Cornell University told of his observations on orcharding in western New York. Quality of fruit should be sought rather than quantity. If the grower has only Ben Davis apples and Kieffer pears he may not be successful. Orchards in western New York are paying in just such proportion as the grower puts energy and intelligence into his work. The great problems to be carefully studied out by fruit-growers are pruning, spraying and tillage. A mistake is made in pruning heavily at long intervals. The grower waits until the foliage is dense and limbs intertwining; then he goes at it vigorously, with result that the tree is thrown out of its normal balance. The whole system of constitution has been so disarranged that it takes several years to bring the tree back to normal condition. Annual or biennial pruning is to be recommended. Spraying trees while in bloom is dangerous and entirely unnecessary. When the tree is bearing heavily it might not prove disastrous, but the bees working on the blossoms are likely to be killed.

Eleven years ago, the tilled orchard was an exception in western New York; to-day, it is the untilled one. Cultivate the orchard part of season, and then sow a crop that will return some of the fertility taken from the soil. During a dry season, tillage should go on much longer. In a wet season, trees do not need so much moisture.—Country Gentleman.

RENOVATING OLD APPLE TREES.

(By Professor L. R. Taft, President of Horticultural Department Michigan State Agricultural College.)

The work needed for the renovating of most of these orchards can be grouped under four heads, cultivation, pruning, manuring and spraying.

As most of these orchards are in sod, the first work is the plowing of the land which should be done as early in the spring as possible, taking care not to injure the roots. From this time until the first of August a harrow should be used once a week or ten days, so as to keep down the weeds and grass and produce a dust mulch to preserve the moisture. At the last harrowing two bushels of oats per acre should be sown, to afford a cover crop for the winter. The following spring this can be worked into the soil with a disc harrow, and no plowing will be needed. This treatment of the soil will give the best results under average conditions, but it may be modified to suit the circumstances. Thus if the trees are far enough apart to make it desirable, some such crop as pumpkins, squash or cucumbers may be grown between the trees, but a grain crop should never be sown in the spring. If the soil is rich and sufficiently moist not to suffer in dry summers, the orchard may be seeded to red clover in July or early August and this can be grown until the second spring, when it should be turned under and the land kept in cultivation until August.

No general rule for pruning can be given except that all dead branches should be removed, water sprouts should be cut out, and if the heads are too thick the branches that cross or crowd can be taken out. It often happens that in the old orchards that the growth has become stunted, and if such is the case it is a good plan to severely cut back the branches. When the branches are so low as to make cultivation beneath the trees difficult, the trouble can often be corrected without cutting off any of the main branches, by removing the ends that hang down towards the ground.

There are few old orchards that will not be benefited by manuring and when it is possible to apply fifteen to twenty two-horse loads of partially decomposed manure per acre very marked results can usually be seen. When a heavy sod has been turned under, this will go far towards furnishing food for the growth of the tree during the following season, and perhaps for one crop of fruit, but for the best results manure must be used and with no sparing hand. Unleached wood ashes will also be beneficial, and, if manure cannot be secured in abundance, it can often be supplemented to advantage with potash salts, acid phosphate and nitrate of soda.

For the spraying of the trees, Bordeaux mixture and Paris green, or arsenic, are all that will be required under ordinary circumstances. Three or four applications will generally be found profitable. The first should be made just before the blossoms open and the others at intervals of two or three weeks. Thoroughness in making the applications is

the first requirement for success, as unless every leaf and fruit are covered with the spraying material perfect results cannot be expected.

SHOULD TRESS BE TOP-WORKED?

The ordinary nursery tree has been propagated by grafting or budding upon seedling stocks, the union being at or near the surface of the ground. If suitable stocks have been used, first-class trees can generally be grown in this way, but there are a considerable number of varieties that, when propagated in this way, do not make a satisfactory growth, and, for all such, top-working is advisable. By this is meant grafting or budding upon the branches, or well up on the trunks of trees that are two or more years old. Many nurserymen make a practice of growing certain varieties in this way, but as the tops are easily broken it is better for the fruit grower, who wishes to grow these varieties, to top-work them upon trees that are already growing in the orchard.

In addition to being able to increase the vigor and improve the form of weak-growing varieties, the hardiness and longevity of many of our most valuable, but somewhat tender, varieties can be increased to a marked degree by top-working them upon some vigorous growing and hardy stock. Such common sorts as the Baldwin, King and Canada Red apple, and the Bosc pear are among those that are greatly benefited by top-working.

Each year millions of trees come into bearing that prove to be untrue to name and in many cases absolutely worthless. The owners have not only lost the first cost of the trees, but, what is many times more, the use of the land and the labor of caring for the trees for from five to ten years. Had the owners planted some standard varieties as stocks, and after one or two years, top-worked them with scions of the desired sorts, taken from bearing trees, they would not only have made sure of the kinds they wished to grow, but would in most cases secure better trees by the top-working. This method of starting an orchard makes it possible to secure what are often spoken of as "a pedigree" trees, as the scions used for top-working can be selected from trees that are known to be regular bearers and that produce large and perfect fruit. Here and there trees can be found that produce more and better fruit than any others in the vicinity, even though they are growing under conditions that are apparently similar, and if the scions are cut from such trees the chances are that the improvement will show in the new orchard.

The adoption of this method of starting an orchard will both lessen the expense of the trees, when new sorts are desired, and reduce the danger of loss from the planting of untested sorts. The new sorts are

generally high priced, selling at from five to ten times as much as the older sorts. By first planting the land with standard sorts, and at the same time putting out a few trees of each of the new kinds, it will be possible, within a year or two, to obtain enough scions to top-work all of the trees with the new varieties if desired, and at a cost much less than had trees of the new varieties been purchased in sufficient numbers to plant the entire orchard.

It is seldom advisable to risk the extensive planting of new and untried sorts, but if the course recommended above is followed it will be possible, in most cases, to fruit the new sorts in two or three years, by grafting them upon bearing trees, and those that give the most promise of value can be used for top-working the trees in the young orchard.

In selecting varieties to plant out as stocks for top-working, care should be taken to obtain such as are of vigorous growth, hardy, and have strong, straight trunks, free from injury from "sun-burn." For special purposes they may be either one or three years from budding or grafting, but two-year old trees will ordinarily give the best results. The top-working may be done the year after the trees are planted, or may be delayed for one or more years longer. Excellent results can be obtained on young trees if the scions are whip grafted upon the small branches about six inches from the trunk. In case any of the grafts fail to grow, there will be a chance to bud the branches a little lower down the following summer. If trees more than two years old are to be top-grafted it is well to extend the work over two or three seasons. When the heads have been started too high, the grafting can be performed upon the trunk below the branches, using the whip-graft for small trees and the cleft graft for larger ones up to an inch in diameter.

Very good results can be obtained in starting orchards in this way with apples, pears and plums, and under proper conditions with cherries, but it should not be used with peaches.

TOP-WORKING LARGE TREES.

The grafting of older trees has been much more commonly practiced, and when performed for the purpose of changing the variety, usually gives good results. On the other hand, failure generally results when an attempt is made to rejuvenate an old and exhausted tree by grafting. Some varieties have thin and delicate leaves that are seriously injured by fungi, and such trees can generally be benefited if top-worked with a variety having healthy foliage. When it is not desirable to change the variety to improve either the fruit or foliage, no benefit can be obtained by top-grafting the trees, as equally good results

can be secured by cutting back and thinning out the branches, thus throwing the whole vigor of the trees into those that remain and giving them thorough cultivation and plenty of manure.

For the top-working of large trees, the use of the cleft graft is advisable, cutting the branches back to stubs from one inch to one and one-half inches in diameter, and inserting two scions in each stub. All outdoor grafting is done in the spring just before the buds open, but, if for any reason is delayed after this time, the scions should be kept dormant by placing them in an ice-house or cool cellar.

THE APPLE CROP.

AT END OF THE SEASON.

(By G. T. Tippin, Nichols, Mo.)

As we have just completed harvesting a remarkable fruit crop in South Missouri, considering the unfavorable circumstances under which it has been grown, a review of some observations made while in constant contact with a great many orchards, both peach and apple, in this section during the past three months, may be of interest to some of the readers of your valuable paper.

At the time of our last communication to the *Fruit-Grower* the peach crop was very promising, and while an abundant crop was harvested, there was a time during July and August when the grower lost hope and his courage yielded to what he then thought inevitable disappointment. As the drouth became more severe, the peaches seemed to stop growing, and we all conceded that the crop was ruined. It was a time when a severe test was being made; one under which the advantages and disadvantages of cultivation or non-cultivation were fully tried. A great conflict was on. Would nature fail in her part, or would she yield a bountiful crop to the keeper of her fields? was the question in every mind. The drouth continued, but when the peaches began to mature the hope of victory began to rise in the minds of those who had faithfully performed their part in the care of their orchards.

While our peaches were not large as usual, the quality was the best, both as to flavor and carrying qualities. We do not mean to say that there were no good peaches on uncultivated orchards, but as a rule the orchards that were well cultivated, with well pulverized surface, were much more satisfactory and the yield went beyond the expectation of the most sanguine. There was but one query. How was it possible for a

peach crop to mature during such a drouth? The fact that it did has demonstrated fully that it does not require much rain to make a fruit crop, if we husband the moisture below by clean and thorough culture.

One man, a fellow-nurseryman, visited us in July, who has forty acres of peach orchard, with apples planted between in about one-half of it. His apple grafts had all died, his peaches were small and he said could not make anything. He was very much disheartened and felt that he must give up, but he had cultivated and cared for his trees, had done his part well and his reward was nearly \$3,000 worth of fruit marketed.

Passing to the apple crop, we will say that while the rainfall was very light all through the season in which our apples were growing and maturing, yet we have had a good apple crop in the south section of the State. The fruit was not large as usual, due to extreme dry weather, which decreased the quantity fully one-third, yet the quality, as a rule, was very good, and the fruit has brought very good prices. While our loss from failure of corn and hay crop is quite heavy, we believe it is fully made up by the fruit harvest in this section and will result in more extensive planting and better care of orchards.

We have made the following observations which hold good as a rule in successful orchard growing:

First—The selection of soil adapted to the kind of fruit that is to be planted, is most important.

This was a season in which we could learn how much assistance we could render nature in doing her work, by cultivation, and where the same help on a plat of orchard failed while it was a success with an adjoining plat is pretty good evidence that the plat failing was not adapted to the growth of the trees planed on it.

Second—While cultivation is always best, in our opinion, this year was one that thorough surface culture brought an especial reward.

Third—As a rule, sprayed orchards were freer from Codling Moth than unsprayed orchards.

Fourth—While there was but little Bitter Rot we found it worse in crowded orchards, where trees were grown together, the lower limbs lying on the ground, the orchard grown up with weeds and grass, or surrounded with thick brush, or any condition that would hinder the free circulation of air and sunlight necessary to dispel the dampness from dews during the night or early in the morning before the sun became hot. We only packed one orchard affected with bitter rot that was sprayed for this disease. This orchard was sprayed only once, and that after the rot had developed. It was sprayed under the super-

vision of Prof. Stinson of the Experimental Station. He left one plat unsprayed, and this gave up only about one-half as many barreling apples as the same number of affected trees that were sprayed.

As we have been asked so often for our opinion of trap lanterns for destroying injurious insects in orchards, perhaps in justice to everybody concerned we should give our observation along this line. While we desire to see every good thing succeed and do not want to do any one an injustice, we are frank to say that the trap lanterns have been failures this year. Orchards that were well lighted with them, bore fruit as badly stung and as wormy as those that had no attention in this direction, either by use of lantern or spray.

We trust that we may profit by the season's lessons, and that our already progressive horticulture in Missouri will take on greater energy.—*Western Fruit Grower.*

THE APPLE HABIT.

"Chicago is the greatest apple market in the world. More kinds of apples, red, green, yellow, mottled, sweet, and sour, are displayed on South Water street than the apple eater among our fathers ever dreamed of. But some one has said recently that we ship more apples than we eat and the decided preference of our people for red apples and big ones, indicates that we prize the fruit more for its appearance than for its taste and texture.

"Some of the New York newspapers have gone so far as to intimate that we treat apples very much as we treat flowers—put them on our tables, pile them up on our fruit stands, choosing colors and sizes simply to make a show—and that, therefore, we miss the great opportunity of being benefited as were our New England and New York ancestors by the eating of apples in season and out.

"An old Scandinavian tradition represents the apple as the food of the gods. The story was to the effect that when they felt themselves growing old and feeble and infirm, the gods resorted to the apple for renewing their powers of mind and body. Trained in such a tradition the Scandinavians like a good apple when they see it, and they like it better when they taste it.

"We have among us a fair sprinkling of New England people. They come to us with traditions not so old as those of the Scandinavians, but stronger in promoting attachment to the apple. There are among us, too, thousand of New Yorkers, Pennsylvanians, Buckeyes and Hoo-

siers, whose ancestors were all great apple eaters, and it would be strange, indeed, if their descendants did not keep up the habit.

"There may have been at one time a little prejudice against the apple among people who are naturally inclined to turn up their noses at anything within the reach of commoners, but the scientists came to the rescue, and showed that the apple, chemically, is one of the most wholesome of fruits.

"The German scientists have pointed out that the apple contains a larger percentage of phosphorus than any other fruit or vegetable, and that this phosphorus is admirably adapted for renewing the essential nervous matter, lethicin of the brain and spinal chord. Our own scientists have pointed out that the acids of the apple are of signal use for men of sedentary habits; that these acids eliminate from the body noxious matters which, if retained, would make the brain heavy or dull or bring about jaundice, skin eruptions and other allied troubles.

"Now everyone knows that Chicago brains are not heavy or dull, and the plain inference is that our people eat a great many apples. Some New York man has discovered that the malic acid of ripe apples, either raw or cooked, will neutralize any excess of chalky matter engendered by eating too much meat. It is also contended that the apple, when taken ripe, and in large doses without sugar, diminishes the acid in the stomach rather than provokes it. We may like big, red apples, as the New Yorkers say, but we like them because they are good apples, and we eat them at home."—Fruit Trade Journal.

EFFECT OF GAS ON NURSERY STOCK.

(By Prof. W. G. Johnson.)

During the past few months, I have had many inquiries regarding the physiological effect of hydrocyanic acid gas upon various grades and kinds of nursery stock. After several years' experience handling this gas, both experimentally and in a practical way, I can give definite information on this question. In April, '99, I began a series of experiments with a view of determining the exact amount of gas nursery stock would stand when exposed one hour.

These experiments confirmed previous tests made by me that the gas, when used as recommended (0.25 gramme per cubic foot of space inclosed) does not injure any kind of well-matured, thoroughly dormant nursery stock. Even the tender terminals of first-class peach were ex-

posed an hour, double the time usually allowed. A peach tree fumigated April 26, '99, with 0.25 gramme for one hour, showed no injury. I found, however, that when 0.45 gramme per cubic foot was used, nearly double the ordinary amount and exposed one hour, first grade peach was slightly injured on the terminal growth. The injury, however, was so very slight that it was not considered harmful to the tree. When about three times the normal charge was used, exposed one hour, I found the trees were more or less seriously injurd. Under no circumstances have I recommended this gas stronger than 0.25 gramme per cubic foot. It is not necessary to use it stronger than this on any grade of stock, and there need be no fear of injury, if the proper precaution is taken.

Similar tests were made also upon apple and I found that even where six times the normal was used, well-matured apple trees were not injured at all. Plum was not injured until nearly three times the normal was used, while pear stood from three to four times the usual dose. All exposures were for one hour April 26, '99, and the trees were set out carefully the same day. They were watchd and cared for during the summer.

June buds and low-grade peach, known usually as whips, were quite seriously injured when exposed with the 0.25 gramme for one hour. I reduced the cyanide to 0.18 gramme, with which amount I found no resulting injury. It is now a well known fact that any wood not well matured will not withstand a heavy charge of this gas. I recommend its use for June buds, peach, plum and cherry stock of low grade from 0.16 to 0.18 gramme per cubic foot, exposed one-half hour and no longer. In previous experiments I found that the scale under ordinary circumstances is destroyed when fumigated with 0.12 to 0.14 gramme, therefore the 0.16 to 0.18 formula given can be used with perfect safety.

Some nurserymen do not care to fumigate buds, grafts and scions with the strong formulas. I suggest that the same amount recommended for the June buds be used for stock of this kind. Any box can be made perfectly tight by papering and painting it. An ordinary box can be converted into a gas chamber very easily. I do not recommend the use of very small boxes, as it is difficult to estimate and handle the exceedingly small amounts of chemicals necessary to generate gas in an inclosure of less than 15 cubic feet. A box amout 4 feet square and $1\frac{1}{2}$ to 2 feet deep can be used to good advantage. The gas can be easily handled in a box of this size by the average grower.

It is not necessary to fumigate such plants as cedar, pine, etc. I do

not advise the general fumigation of roses and other supplies usually handled by florists, with the stronger formulas. It is necessary to reduce the amount to 0.10 to 0.15 gramme when fumigating stock of this character. I will give further details for the fumigation of greenhouses in future issues if desirable. I will also give an illustrated article soon on orchard fumigation, in answer to several inquiries.

Although one of the most dangerous poisons known to chemical science, hydrocyanic acid gas will be used more and more each year. The conditions are such that no other treatment known can be substituted for it. It is cheap, easily generated and safe when applied intelligently. It is invaluable, but there is danger of getting too much of a good thing. Follow directions with explicit exactness and all will go well.

Do not apply under any circumstances the old negro's philosophy, who said: "If a quarter pound Paris green will kill dem 'tater bugs dead, a half pound will kill 'em deader." I have known intelligent nurserymen, who have applied too much gas for too long a time, and then wonder why they had injured their stock. The negro's philosophy will not work in either case. If 0.16 to 0.25 gramme cyanide per cubic foot kills the scale, and all other live insects, let that suffice and give them a decent burial.—Orange Judd Farmer.

COLD STORAGE.

Mr. Simms: Cold storage has been successful for the past season and it seems as though we need it in our business.

Mr. McGill introduced the following resolution:

Resolved, This this Horticultural Society believes that a cold storage plant should be established in Bentonville, and that we believe it would be a paying investment.

Mr. Green: If I had 1,000 barrels of apples I would put them all in cold storage before I would take a dollar a barrel.

Mr. Eld: My apples had Bitter Rot so bad last year that I only put 70 barrels in cold storage at Rogers. Put in good and sound apples, but felt doubtful whether cold storage would save them. They came out in good shape, and it is safe to say Bitter Rot will not develop in cold storage. If a barrel costs 35 cents, cold storage 50 cents, the apples are worth \$1.00 and the labor 15 cents, it brings the cost of a barrel of apples at \$2.00 and they have sold readily at \$3.00.

Mr. Davis: I put a mixed lot of apples in storage at Rogers that

would have been dull sale at picking time. This spring they brought me \$3.00 and \$3.50 a barrel.

Mr. Gipple: Every year those who use cold storage are making money. A neighbor sold his apples from cold storage and guaranteed them. He did not lose by the guarantee. He gave me a barrel and I believe they came out of storage better than they went in. He made \$2.25 a barrel.

Mr. McGill: Capital wants a safe and profitable investment and it looks as if cold storage is both.

Mr. Henthorn: I never lost an apple in cold storage at Rogers. Whether cold storage is in Bentonville or not we must use it.

Mr. Gipple: Rogers can not store half our apples, even if Mr. King doubles his capacity.

The resolution was adopted by unanimous vote.—Benton County, Arkansas, Horticultural Society.

HOME MARKET FOR FRUITS.

To secure a home market for fruits, which, by the way, is the very best market that can be had, we must grow the best fruit, of the best varieties that can be had, pick and handle the same with the greatest care, grade and pack honestly in new, clean baskets or packages and place it on the market while it is fresh.

In making a "home" market for our fruits it will be found that *looks* will go a very long way toward success. For instance, let us suppose a case which, I can assure you, is not overdrawn in any particular: A and B own fruit farms near a thriving city. Both grow good fruit, and both seek a home market.

A being a man who takes pride in himself, as also in his business, secures a good team; has his name and that of his farm neatly painted on his wagon; buys new baskets; carefully and honestly assort and grades his fruits; plainly stamps on each package his name and the grade of fruit the basket contains; makes himself clean and tidy, and presents his goods in a gentlemanly and business-like manner to his customers. He shows them as nearly as possible the difference in the grades of fruits, and asks them to kindly report to him the next time he calls if they do not find the fruit just as represented. This man has created a favorable impression, and even if his prices seem a little high he will have no trouble in selling his goods.

B, whose fruit is just as good as A's, but could not spend the time

to grade it, and who thinks "*anything will do*," gathers up all the old mouldy, dirty boxes, baskets and barrels, dumps in the fruit without assorting, loads them into an old rattletrap wagon, hitches up his old rattle-bones of a horse with harness tied up with strings and pieces of rope, himself wearing the same clothes he has worn while milking his cows and feeding his pigs, with trousers' legs tucked into his boots—he is ready to look for customers. He arrives in town, himself and his fruit, covered with dust, one about as inviting to look at as the other, and few people are found who would want either the man or his fruits; he gets rid of a small quantity to the poorest people and at the poorest prices, he is disgusted and discouraged, and says there is no money in growing fruits.

Now, kind friends, this picture is not a fancy one. I could show you dozens of just such fruit growers as B, and if you were to talk with them they would tell you the fruit business does not pay, and that the market is glutted with fruit.

The demand for A's fruit will increase from year to year, while B will become discouraged and give up fruit growing as a bad job.

More than twenty years ago, when I began furnishing plums for our home market, there were many people who had never seen a good plum; but since that time, notwithstanding the fact that many others have gone into the growing of them, I have never been able to supply the demand for them.

I now have many young trees just come into bearing, and shall continue planting each year. I hope in time to be able to meet all demands for them. It will be many years before there will be an overproduction of *strictly first fruit for "home markets."* Growers must strive to produce larger quantities of No. 1 fruits and a much less quantity of inferior fruits. This can only be done by a more thorough knowledge of the best methods of pruning, thinning, fertilizing, cultivating and spraying the orchards.

The growing of better fruit will in a great measure solve the problem of overproduction; the better the fruit the greater will be the quantities consumed. The best fruits, fresh from the trees and vines, will increase our appetite in about the same ratio that poor, half-ripened fruit will decrease it.

To convince you that people do appreciate good fruit and are willing to pay for it, I will give you my own experience in marketing strawberries. For the past three years I have sold my berries to our leading marketman, because he was willing to pay me a price that I considered better than to peddle them myself. I use for my strawberries and rasp-

berries only new baskets (standard size quarts) and Kevitts patent display crate. All my strawberries are assorted after they come from the field, the baskets are filled "*heaping full*" and the top layer is faced up with hulls down, being very careful that the top berries are no larger or better than those in the rest of the basket.

I have pickers enough, so they get through by twelve or one o'clock each day. Thus every basket reaches the consumer the same day it is picked, and it is always understood with my marketman that should any customer complain of any basket of my berries being other than as represented, he is to give him another box and charge the same to me. (I have never had a box charged back yet.)

The first season I paid my marketman 3c per box for selling, and since then I have made a contract with him each season to take all my berries (strawberries and raspberries) at 15c per basket. They are delivered to him twice a day—at 11 a. m. and at 4 to 5 p. m.; thus, he has fresh berries to deliver to his customers for dinner and tea. (I live but one mile from the market.)

The season of 1898 was without doubt the greatest strawberry season ever known. Good berries from local growers were brought to this market and sold six boxes for 25c and 10c per basket was considered a good price. The first few hundred baskets of my berries brought 25c per basket, then dropped to 20c, then to 18c, and at last a few sold at 15c, the left of the crop bringing 18c to 20c—and all the raspberries brought 20c. And still you must understand the market was flooded with good berries. Occasionally a customer would try a cheap lot, but invariably came back to my berries, claiming they were cheapest in the end. Even the few seconds I had brought as much as other berries were selling for. People knew that my berries were fresh and clean, and they had learned that they could depend on getting the same grade of fruit every time, and it was no uncommon thing when our noon load was delivered at the market to find a dozen or more people, and many times teams from neighboring towns, waiting to secure a supply of my berries. And these teams had driven past other fruit farms and come five or six miles to get these berries, which were really no better than mine while they were on the vines, but were fresh picked, clean, honestly assorted *and the baskets were full*—and the people had learned these facts. Now, I have no patent on these methods or no monopoly of a "*home market*." If you grow fruit and have no home market for it, *make one*; I had to make mine. Of course, people who grow five to ten acres of strawberries cannot always dispose of them in their home markets, but there is more money in "*smaller fields and better fruit*."

What is true of the smaller is also true of the larger fruits. There will always be a demand at paying prices for *the best*, but only by the proper pruning of the tree and thinning of the fruit can we grow the best.

A. A. HALLADAY.

IMPORTANCE OF PROPER PACKAGES.

Some of the most serious problems that confront the fruit grower are those connected with the questions of harvesting, packing and marketing the product. This has been found especially true in relation to the export trade in fresh fruits. In numerous instances efforts to increase the sale and use of American fresh fruits in foreign markets have failed through the imperfect understanding that exists among growers, packers and shippers, as well as transportation companies and their employes, in regard to the requirements of the markets to be supplied and the methods of harvesting, packing, storing and shipping necessary to meet those requirements. The development of that steady demand which is necessary to build up trade is in many cases retarded by the variability in condition of consignments on arrival. A shipment which arrives perfectly sound and in every respect satisfactory is frequently followed by one or more that arrive in bad condition. The result is loss of confidence in the reliability of American fruit as a staple article of trade and a disastrous lowering of prices. For these reasons it seems highly important that provisions be made for a careful study of methods of harvesting, packing, storing and transporting fresh fruits, both at home and abroad, with special reference to the development of the export trade in them. Authority to make experimental shipments should also be provided for in this connection. In addition to the immediate beneficial effect resulting from such an investigation, it would have a direct bearing on the selection of varieties for the commercial orchards now being planted in many sections of the country, and thus exercise an important influence on the character of the commercial fruit supply of the next two decades. It is therefore strongly urged that provision be made for the prosecution of this work during the fiscal year.—W. A. Taylor, Assistant Pomologist, U. S. Department of Agriculture.—Colman's Rural World.

KEEPING QUALITIES OF APPLES.

Cold storage for apples is as necessary as for meat or other products. Many excellent experiments have been made in regard to the keeping qualities of apples. Therefore the following condensed report collected by Ice and Refrigerator will be of interest to apple merchants:

In recent bulletin issued by the United States Department of Agriculture, the results of various experiments on the keeping qualities of different varieties of apples made at the Canada Experiment Farms, stored in cellar, only one variety, the Ben Davis, came out at the end of May with all the fruit sound, the Newell being next with 93 per cent. sound, the Wagener third, 88 per cent., and the Ralls Genet and Winesap 82 per cent. The temperature ranged from 35 to 40 degrees F. for three months, while during the cold snap the temperature fell to 26 degrees. The apples were undoubtedly frozen, but were in the dark and thawed out gradually."

The relative keeping qualities of varieties under cold storage conditions was tested by the Nebraska Horticultural Society. The fruit there tested went into cold storage in the fall of 1897 and was taken out at intervals during the summer of 1898, and at that time examined, and each variety marked according to the condition in which it was found. Thirty-four varieties were tested, and of these seven varieties came out November 1, 1898, practically in perfect condition, viz., the Ben Davis, Winesap, Ralls Genet, Limbertwig, Willow Twig, Gilpin and Lansingburg. The White Pearman kept till June and the Russet till July. The Wagener, which ranked third in the cellar test, ranked the poorest of the thirty-four varieties in the cold storage test.

One of the most interesting parts of the report is the account of the behavior of the different varieties in cold storage. Some retained all of their good qualities up to the close of the exposition, November 1, 1898. These were Ben Davis, Winesap, Ralls Genet, Limbertwig, Willow Twig, Gilpin and Lansingburg. Although the Salome lost a little in quality, it kept well in storage and on the table. Fruit taken from the storage June 1 retained color and firmness for nearly five week. Some retained good outward appearance, but lost in some other quality, as, for instance, the Iowa Blush, the skin of which became so bitter as to render it unfit for use. On the other hand, some varieties retained their eating qualities, but lost in outward appearance. Such was the Milam, which kept well but lost in color. There was also numerous other kinds of deterioration; Minkler lost flavor and began to decay; the English

Golden Russet and Fulton shriveled; the Roman Stem became mealy and lost flavor; Sheriff and Walbridge discolored so badly as to render them unfit for show or market, and they deteriorated rapidly: Fameuse retain color, but many burst, and after a few days became mealy; the Yellow Bellflower went down suddenly.

Moreover, the behavior of varieties having a certain characteristic in common was not always the same in respect to it. The Missouri Pippin, a dark apple, faded in storage, but the Walbridge and Sheriff, also dark apples, came out almost black; nor did the lighter colored apples fade more than did the dark red ones, for Grimes Golden and Yellow Bellflower, both yellow apples, held their color unchanged, while Missouri Pippin, a red apple, as has been said, faded.—*American Fruit and Vegetable Journal.*

THE PEACH IN MISSOURI.

(By Hon. N. F. Murray, President Missouri State Horticultural Society.)

This, the most delicious of all fruits when properly grown, may, by a careful selection of the most hardy varieties and a suitable location and a thorough knowledge of the business, be grown successfully from Maine to California and as far north as Central Iowa, yet there is not one-fourth enough grown to supply the demand. In a few of the celebrated peach centers, such as are found along the shore of Lake Michigan, the Chesapeake and Delaware peninsulas and some sections of Missouri, Arkansas, Georgia, Texas and California, it may occur in a year of an abundant crop and for lack of proper methods of distribution, or want of due preparation upon the part of growers to care for and handle the crop by shipping only the finest, and canning and evaporating the balance, some may go to waste and thus an impression goes abroad that there is an over-production, which is not true. The fine looking peaches usually found in the large city markets of the Mississippi Valley come from some of the peach centers referred to and sell at prices that bar their use by the common people, while the smaller cities and towns and the great majority of the farmers of the West seldom if ever have a sufficient supply of this luscious, life-giving fruit. There is no good reason why the millions of people living in the Mississippi Valley should go with such a meagre supply or be dependent upon a few great peach centers a great distance away, the older of which are more or less affected with the peach yellow, a disease as much dreaded and as fatal to their trees as hog cholera is dreaded and is fatal to the swine of the Western farmer. It often occurs that much of the fruit

on trees affected with the yellow ripens prematurely and partakes of the disagreeable bitter found in the bark of the tree, and although looking nice and very tempting it is unfit for use. This disease is rarely found in the Western States, and we have every reason to believe that most of the peach orchards on the virgin soil of this section will prove immune to this much dreaded disease for a generation to come.

We meet the objection in the West that the trees are occasionally damaged and sometimes killed by the winter, but we must remember that the peach tree is of a very quick growth and comparatively short duration in all countries, and as they can be grown so very cheaply, quickly and easily, bear so young and so abundantly, that we should not be deterred in the least from planting them on account of shortness of life, but rather plant them more liberally and constantly from year to year, that we may have young orchards coming into bearing as old ones pass away, the wood of which makes good fuel and will pay well for clearing the land. It is rarely that we ever have a winter that does serious damage to any great number of peach trees in the West. The winter of 1898-9 was the worst, perhaps, in the history of the country and may not occur again in fifty years. Millions of trees were damaged and many killed outright, even in some of the noted peach centers, but the growers (be it said to their credit) went to work at once to repair the damage done by cutting back those that were damaged and grubbing up those that were killed and replanting, or by planting new orchards on new clean land.

Some object to growing peaches extensively for the reason, as they say, that we have not a sufficient market near by to quickly use up a large quantity of such tender and perishable fruit, but let us remember that in the Mississippi Valley is just where we have the large cities, thrifty towns, a dense farm population all over the country, and last, but not least, the wealth to make the best market in the world.

On a tour to California last fall we spent two days at Grand Junction, Colo., which has become quite a fruit center, having, as we were informed, shipped 75 car loads of peaches last year. In conversation with one of the growers we were informed that they grew them on land that cost \$200 an acre and had to be irrigated, that they picked them carefully, wrapped in tissue paper, packed in 20-pound boxes, hauled them 30 to 40 miles to railroad, and paid \$500 freight per car to Missouri river points! This gentleman further stated that they did not get a crop every year, that their trees were badly damaged with the winter of 1898-9, and that some years after paying the charges they had but little left, but on the average they found it a paying business. Permit me to ask, about how many Missourians could be found that would engage in peach grow-

ing under similar conditions? We venture, not one. We don't have to, for we have a better country—one where the conditions are most favorable—one where we have cheap land that needs no irrigation and where we have fine markets at our very door for a large amount of our peaches, and railroads at our very orchards that give us quick transportation for our surplus. With all of these advantages in our favor why should our people be dependent upon the inferior fruit of the remote and irrigated regions of the Great American desert for their supply?

Growing fine peaches in Missouri is no longer an experiment. In 1870 we planted 500 trees in Northwest Missouri. The varieties were Hale's Early, Troth's Early, Stump, George the Fourth, Crawford Late and Early, Smock, Susquehanna, Heath Cling and Late Delaware, in addition to fifty seedlings. All were cultivated for three years in corn and potatoes, after which they were cultivated thoroughly for fruit alone. The Crawfords and Susquehanna proved to be very shy bearers, but the fourth year from planting they netted \$400. They continued to bear three years out of five, and one year the three acres netted \$900. The Hale proved the hardiest and bore four crops in five years. The seedlings were the least profitable and were first to die. One remarkable thing was that we had one crop after 21 degrees below zero. This statement may be called in question by the Eastern growers, where the peach buds are killed at 10 to 15 degrees below zero. It must be remembered that the amount of cold the buds can endure without killing depends upon the variety, location, soil, climate, care, cultivation, condition of buds when the cold strikes them, duration of storm, etc.

The varieties named have been superseded by newer introductions and by varieties to meet the demand of the market, many of which are very hardy and reliable. Those best and most profitable to plant will depend upon the locality in which you live and the purpose for which you design them. This is a matter of great importance and one that should be studied closely.

All the peaches we have grown in Holt county, Missouri, have netted us \$1.50 per bushel, and to show that we still have faith in the business will say that we have in the last two years planted 6,000 trees and will plant more. We know of men here and there in all the states of the Mississippi Valley making good money growing peaches, and we believe there is room for many more to engage in this pleasant and profitable industry, not only for the purpose of supplying the home demand with fresh fruit, but large quantities should be grown for canning and evaporating, nor need the people of Missouri stop at this, but may with courage and safety plant large commercial orchards and enter the markets of the world as a bold competitor.—Practical Fruit Grower.

COMMERCIAL VALUE OF PEACHES.

(By Prof. R. H. Price, Texas Agricultural College.)

At present it seems to me that the peach is the most important fruit grown in Texas when considered from a commercial standpoint. To get a clear idea of the commercial value of the peach, we must consider the cost of growing and marketing. I will begin with the cost of setting the orchard. Good trees can be purchased at five cents apiece, and when set 20 feet apart each way, it will take 108 trees to the acre. These 108 trees will cost \$5.40 to start with. It will cost about \$2 to plow the land and put it in shape for setting. To set them out, it will cost about 2½ cents per tree. This makes the acre cost \$10.20, set to peach trees ready for growing the orchards. If good varieties are used, the orchard will bear a fair crop the third year. The cost of cultivating and pruning this acre each year will be about \$5. The cost of the acre, then, will be about \$15.10 until the first crop comes in. However, such crops as potatoes, cantaloupes and even cotton are grown on the soil while the trees are young, and frequently fully pay for the cost of cultivating. These crops should not be grown on the soil unless it is fairly rich, since they check the growing trees, especially so if a drouth should come on late in summer. No crops should be grown close to the trees, as they take too much moisture away from the young trees and do not leave enough room for good cultivation. I have seen many young orchards ruined by growing crops in them and not giving good cultivation.

In canning our Mamie Ross peaches we found that one bushel of this fruit filled 22 of three-pound cans, which at 16¾ cents per can amounted to \$3.68 per bushel. From this amount should be deducted, of course, the cost of growing the peaches and the cost of canning, which was \$2.20. This leaves a net profit of \$1.48 per bushel for the fruit, beside the peach stones that are used for planting, and the peach paring that makes a most excellent jelly. I am informed that in the peach sections of East Texas the growers frequently sell the fruit on the trees at 40 cents per bushel. They average about \$100 net profit on an acre of peaches. While I consider the commercial value of peaches quite satisfactory, it must be understood that it requires skilled labor to handle the crop all along from the setting of the orchard to marketing the crop. There are times when some spraying for insects and diseases is necessary, sometimes fertilizers should be used, careful pruning should be done to produce the finest product, and the successful grower will be satisfied with nothing short of this.—Orange Judd Farmer.

BUDDING THE PEACH.

HANDLING THE PEACH ORCHARDS.

When the principles which underlie the successful handling of the peach in orchards are well understood our farmers will grow an ample supply of this choice fruit. Many people suppose that budding is a difficult art, and therefore plant peach pits and grow and plant in orchards seedlings instead of budded trees. Many of them likely are not aware of the fact that the hardiest varieties of budded peach, selected partly because of their known hardihood as well as of quality, size and suitable time of ripening, are much hardier than seedlings, just as the hardiest known varieties of apples are very much hardier than the seedling apples. A moment's reflection will show that all varieties were at one time seedlings and that only such as show superior merit, hardihood, quality, productiveness, are taken up by our Horticultural bodies or by nurserymen and propagated.

AN EASY TREE TO BUD.

The peach is perhaps one of the easiest of all trees to bud and a few suggestions will enable any bright boy or girl to grow the most desirable and hardiest budded varieties. Pits of the peach are saved in August and September from ripening fruit and ought to be stratified in moist soil, or should be allowed to lie a considerable time and become dry it is considered wise to let them stand in very moist soil or stratified earth for some little time before planting. Then they should be planted in soil that has been so carefully prepared that it is not likely to dry out during a succeeding dry winter. The kernel of the pit should be plump enough with moisture so that the frosts of winter expanding the moisture of the pit should rupture the shell and allow germination the following spring. These pits should be planted three inches apart in nursery rows three and one-half feet apart. With good cultivation they will attain the first season a height of from two to five feet, depending on the character and quality of the soil and the amount of rainfall and cultivation.

SUGGESTIONS FOR BUDDING.

From the 10th to the end of August these little trees should be budded at the surface of the ground with matured leaf buds, not fruit buds, from other trees of desirable varieties. Using a very thin and sharp knife, a cross cut is made just through the bark, a slit an inch or more in

length below it, allowing the insertion of the bud cut from the twig in such manner that there is the slightest possible film of wood and bark one-half to three-quarters of an inch in length. This bud is tucked in this open slit of bark and then tied up, using three or four wraps below the bud and as many above, tying with raffia, cotton twine or woolen yarn, the object being to keep the bark closed to exclude air and water. This should knit in a few days and within two weeks it is usually necessary to cut the string on the opposite side of the tree from the bud to allow for the expanding size of the growing stock. Otherwise the expansion of the growing stock would cause the string to girdle the tree and choke the bud. Early the succeeding spring before sap starts three-eighths of an inch above the bud cut away the seedling stock and be careful to allow only the bud desired to grow. Rub off suckers. These young trees the first summer will, with suitable care, attain a height of from three to seven feet, depending on the character of the soil, amount of cultivation and the rainfall.

QUESTION OF HARDINESS.

They should be dug about the 1st of November and buried in earth to winter, for the reason that such trees are apt to make a rank growth and do not ripen up as completely the first two or three years as they will with increasing age and the growth thrown into more branches. The writer is in the habit of sowing oats at the rate of three bushels per acre in the nursery rows about the 1st of August, which shall so draw upon the surplus moisture as to compel the ripening of the trees and thus being mature when the first blasts of winter come. The question of hardiness of most varieties of fruit trees is very largely a question of the condition of ripening or maturity. Fruit trees that are perfectly ripe and mature can stand without harm a low range of temperature. It is the trees which from unwise, too late cultivation or warm and moist autumns are tempted to grow too late that are unripe, and which suffer severely with succeeding winters. The heavy destruction and loss of trees in the winter of 1898-9 was not so much due to the temperature of 30 or 40 degrees below zero as to the fact that the autumn had been warm and moist and that trees were not as well matured and as completely at rest as is usual in our State.—*Twentieth Century Farmer*.

GRADING AND PACKING PEACHES FOR MARKET.

(By Prof. W. G. Johnson.)

It is surprising how few fruit growers make necessary preparations in advance for handling their crops in the best possible way. Last June, when visiting the peach orchards of the Blue Ridge and Alleghany mountains, I estimated that a certain company would have between 60,000 and 70,000 bushels peaches. So far as could be seen no special preparations were being made to take care of this crop, which was an unusually large one. When the same orchard was visited again the latter part of August the packers were at work. There was no special organization. Some of the packers were sitting on the floor, while others were more comfortably seated on basket or box. The picture tells the whole story, and is well worth careful study. Several thousand bushels of as fine peaches as I ever saw were lost in this orchard owing to lack of systematic organization.

In striking contrast with this system, I saw some well-organized packing sheds in the same neighborhood where every bushel of fruit was saved. In Georgia and Michigan the same careless indifference was seen in many orchards. On the other hand, in some orchards the fruit was handled in the most careful manner. In the orchards of J. H. Hale, the fruit is sorted into three grades and placed in long canvas trays arranged in compartments in front of the worker, about one foot above the center of the table, with the packers on the opposite side. The peaches are classified into three grades and then packed into carriers of six baskets each. About 100 peaches of extra large size are packed in a carrier. The No. 1 size usually requires from 120 to 150, while No. 2 takes from 190 to 210. Peaches below this size are as a rule not placed in carriers.

The fruit is carefully graded by experts, many of them being orange packers from Florida. Every peach must be up to standard size, without blemish and in perfect stage of ripeness before being placed in a basket. The general foreman of the packing shed keeps a very careful watch over all the fruit packed, and before the lid is nailed on a crate an expert makes a final inspection, being sure that every peach is up to standard. If a single peach is found containing a bruise or blemish of any kind, the entire crate is returned to the packer and as a penalty must be repacked. The fruit is handled mostly by white men and women, and expert packers can put up from 80 to 100 carriers per day, the

number depending largely upon the variety and amount of fruit being packed. Some experts pack from 175 to 200 carriers a day, each person handling from 20,000 to 30,000 pieces of fruit, in addition to removing the baskets and middle tray of each carrier. Some fruit growers, throughout the north particularly, say it is impossible to thoroughly round up a basket of fruit, especially where several different sizes are handled. The filling of a basket will depend largely upon the man or woman doing the packing. There are several standards which must be followed in order to fill a basket with peaches or fruit of any kind.

In the Hale orchards all the fruit is graded by hand. Many large growers use graders, several kinds of which are upon the market. The work is greatly facilitated where these machines are used, and from 1,000 to 2,000 bushels can be run through them in a day if the fruit is available.—Orange Judd Farmer.

HOW MUCH COLD WILL KILL PEACHES?

This question is hard to answer. I have watched many years; as a rule 18 below zero will kill peach buds, but I have seen them endure 28 below when not far advanced or swollen, and killed at 10 when buds were swollen. The same is true of blooms. I have watched the blooming of peach and other trees under various conditions of temperature. Much depends on the condition of the atmosphere. When it is dry the trees will hold their bloom much longer at the same temperature than if wet. Also, if the buds have not been injured they look red and healthy; if injured in the bud and are pale red, they will not endure much cold. In fact some are killed in the bud and still bloom. Cold rains are very fatal during the season of pollination. When the flower petals are open, and the delicate organs of fructification are fully exposed, damp weather with a low temperature causes them to drop off. This unfavorable weather causes fruit to drop off when the fruit is quite a good size. Again after a freezing, gradual thawing is much better than sudden thawing.

JACOB FAITH.

J. H. HALE ON PEACH CULTURE.

We know of no one who has had a larger experience along this line than our friend Hale. Mr. Hale has recently written a long article on this subject for the *Rural New Yorker*, and we condense this article for *Green's Fruit Grower* as follows: I find my views of peach culture changing, therefore rules which I have laid down need revising. The first essential to successful peach culture is a love for trees, plants and other living things. In order to be successful in peach culture you must take a pleasure in the growth and in the development of your trees and orchards. You must love peaches because they are so beautiful and good. You must have horse-sense and good judgment generally.

The soil for a peach orchard is a warm, loamy soil, yet any land except a strong clay will give good results. I used to apply commercial fertilizers freely, but have learned that they are not necessary in many instances, providing sufficient culture is given to the orchard. I am reclaiming abandoned farms; clearing up tracts of land covered with brush and other rubbish, and am planting them to peach orchards, clearing up the rocks, etc., at considerable expense. It will pay to use a sub-soil plow before planting peach trees except where lands have sandy or gravelly sub-soil. Do not plant the trees until your land is well subdued.

Plant big trees. I used to think that small sized trees were just as good as big ones, but I have changed my mind. I do not care anything about the shape of the top of peach trees since I cut off the top. I want a good root and a strong cane from fifteen to eighteen inches high with the top cut off. I have planted peach trees in large orchards thirteen feet apart or closer each way, but generally speaking plant peach trees eighteen to twenty feet apart, since if planted closer together it necessitates much pruning. Give this entire field up to the peach trees, planting no other crops in the orchard, and give the orchard thorough cultivation. Harrow and cultivate at least once a week for the three best growing months, June, July and August, during the first two years. After a month or six weeks of good culture sow cow peas over two-thirds of the space between the rows of trees, leaving space for single horse culture up and down each side of the trees for two months more. Leave the pea vines on the ground during the winter months. Fifteen or twenty pounds of

clover seed per acre is little enough. A clover carpet over the ground through the fall and winter is a great protection to peach roots. Seed down in the fall with clover seed, at the last cultivation, plowing the clover under early the next spring. The growth of all trees is most vigorous in the early spring. Therefore, give early cultivation.

Prune so as to leave a partially open head. Do not shorten branches too much the first year. The second year shorten liberally all the longer branches. Promptly dig out and burn all trees affected with the yellows. Thinning the fruit is very important. Picking, packing and marketing are the next important matters to be considered.—Greens Fruit Grower.

GRADING UP STRAWBERRIES BY SELECTION.

(R. M. Kellogg, Michigan.)

Variation in plants is an important factor in fruit growing. Plants grown from seeds have a father and mother the same as an animal. When we propagate by buds and runners we have only a "mother" in a figurative sense. It is really a division of the nodes in its own body which contain the protoplasm, yet they are new creations just as much as the plants grown from seeds. Being a division they contain the vigor or weakness of the parent plant. They usually closely resemble and bear fruit the same as the plant from which they are taken and yet under changed conditions they often make remarkable variations; sometimes so much as to constitute a distinct variety.

Now we may take advantage of these variations and fix in our mind the kind of plant and berry we want to produce and continuously select plants which we find here and there in the field approaching most nearly to the ideal we want and propagate from these, keeping them under restriction to prevent pollen exhaustion and greatly improve them.

Sixteen years ago I adopted the following plan: I always set my plants in spring and then keep sharp watch during the summer when hoeing and cultivating for plants which show qualities superior to follow and set a numbered stake by them. A record is kept in a field book on a scale of one to ten. Careful examination is made at stated periods during the season. Foliage, disposition to make strong fruit buds and few runners are carefully noted. The next spring when buds begin to show many of the plants staked are

discarded and from the remainder, one-half the buds are removed to prevent pollen exhaustion.

It should be remembered that these plants are grown in stools or hills and all runners removed as fast as they appear to encourage the habit of forming seed buds instead of runners. Since such plant is really many plants consolidated, the fruit stems must be treated as individuals. When the fruit is set it is thinned to three or four berries to the stem. Since strength is developed by exercise they must be allowed to bear some fruit. I am firmly convinced that if the blossom buds are removed every year, they will lose the habit of forming fruit buds and throw their strength into the formation of runners the same as a pollen exhausted plant.

When berries are ripe their size, color, firmness and flavor are carefully noted in the scale book and footings made, and the plant showing the most points of excellence is then taken as the "mother" of all the future plantings of that variety. It is given high tillage and irrigation and runners are potted as fast as they appear and transferred to the special propagating bed where they are allowed to make runners for next season, when the search for new and better variations is continued as before. Thus year after year we are throwing out the weaklings and accumulating the good qualities in the plants upon which we are to bestow our labor and use of land.—Orange Judd Farmer.

FIRST PRIZE ARTICLE ON STRAWBERRY PATCH.

Soil—I prefer a two-years' clover sod to anything else, with barnyard manure applied just before seeding to clover. The mechanical condition of such soil is superior to land that has been cultivated two or three years that is a pleasure to work it. I have tried the cultivate-two-or-three-year plan to my sorrow. Rain will pack such land and make it very hard, while a freshly turned clover sod will be friable and mellow. While white grub has never destroyed any plant for me I have had them injured by mice, also by the application of coarse manure just before setting.

Time for Setting—Spring is the best time to set the plants. The fellow who waits till August to save work will also save himself the trouble of picking very many berries.

Soil Preparation—After plowing, work the ground with harrow and float till it is thoroughly fined and firmed, finishing with the float. Mark with a light hand marker made hand-sled fashion, with runners $3\frac{1}{2}$ or 4 feet apart.

Setting the Patch—Take plants from a new bed that has never been allowed to fruit. Trim the top to two or three leaves and the roots to five inches length. The spade is the most satisfactory tool I have yet found for setting plants; it should never be pushed straight down, thus making a large hole, the bottom of which cannot be closed. The best way is to set the spade square across the mark, face down; push it into the ground on a sharp angle, push handle forward far enough to insert plant under spade, withdraw spade and press the earth firmly against the plant. There can be no cavity under plants thus set. Set plants 15 inches to 3 feet apart in the row, according to variety. Free runners like Warfield or Brandywine can be set even four feet apart on strong soil, and the runners trained in between to make one continuous row.

Care of Patch—Cultivate immediately after setting, with very narrow teeth on cultivator running close to plants; cut off all buds the first year. When runners appear cut them off. Repeat this once then let them grow. My great desire now is to get them to root. The best way to do this is to cover them with soil. This is accomplished by adjusting the cultivator so the front tooth will make a little furrow for them to fall into and the rear tooth will fill it, and so cover them. They will easily grow through two inches of soil.

When the row is of the desired width I chop runners off with a knife made of thin saw blade. By this method of getting the plants rooted early in the season they will make a very strong growth by the following spring, and be able to bear a large crop of berries. Neither will they set so thick as they would if cut a number of times before allowing them to run.

For early berries a southern slope is best. Cultivate until after blooming, then mulch between rows. Frost will strike much quicker on straw than on cultivated land. To prolong the season, set late varieties on a northern incline. Mulch very heavy and leave it on late.

To every boy and girl intending to set a strawberry patch I wish to add a word of warning. If you plant anything but staminate or perfect-flowering kinds, be sure to set staminate varieties every third row at least, to cross-fertilize. A mistake on this point is the worst you can make; your labor will be lost.—G. H. Marshall, Mich., in *Ohio Farmer*.

THE BETTER THE LAND, THE BETTER THE BERRIES.

The better the land, the better I like it, says R. M. Kellogg. The growing of all small fruits is enormously profitable when grown

under favorable conditions. It does involve considerable thought and what some people call labor, but the returns are ample. Indeed it is about the only thing in the way of farming that will enable a man to pay the present high wages with a certainty of coming out ahead, but this cannot be done on poor land. I have picked many crops of berries that paid the entire expense of growing them, and the purchase price of the land besides, and so, if I did not have the best land I know of, I would not use the poor land I happen to have, but I would buy another or rent, with the privilege of buying later on. I would locate it as near the city manure piles as possible, but would go further away to get extra good land, and then depend on rotating crops and ploughing under leguminous plants to get nitrogen and humus, and supplement this with ground bone, wood ashes, or what is nearly as good, sulphate of potash. I would plan my work two or three years ahead, and employ enough help to do every thing well and at the right time to secure the best results. Every thing done in this way yields a profit and a great deal of pleasure. I put a great deal of time on fitting the land. I want the oxygen of the air to come in contact with every soil grain to render the plant foods soluble and immediately available for the use of the plants so they shall never get hungry. I usually set the strawberry plants on a cone, or if there be too much rubbish, I use a dibble, always exercising the greatest care to have the top of the crown just above the surface, and roots all separated and imbedded firmly in soft, mellow earth. My favorite way is to grow them in the hedge row, that is a modified hill culture. The rows are from thirty to thirty-five inches apart, and then each is allowed to make enough plants so they will stand directly in line, and from six to ten inches apart, after which the runners are all clipped off with the rolling runner cutter which does the work very fast and effectually. The advantage of this is that the plants are consolidated and arranged so that every leaf comes in direct contact with the sun's rays, so that the assimilation of the plant's food is perfect, and each plant has its own root pasturage between the rows, and is not making war on other plants to get food. The plants being set in a straight row, only occupy a strip at first of scarce two inches wide, and even here the cultivator teeth will break the surface so as to destroy capillary passages, and the whole surface is kept covered with the loose earth mulch, so the moisture cannot get away.—*Prairie Farmer.*

INDEX.

A

	Page
Act of Incorporation.....	7
Address of Welcome—Summer Meeting.....	17
Address of Welcome—Winter Meeting.....	153
Address, Response to Welcome—Pres. Murray.....	19
Address, Response to Welcome—Pres. Murray.....	153
Agriculture in the Common Schools—G. B. Larum.....	136
American Apples Abroad—Prof. Whitten.....	351
Anthraxnose	44, 48
Apple and Peach Trees, How to Grow—W. L. Howard.....	369
Apple Crop, Distribution of—J. S. Atwood.....	122
Apple Crop, The—G. T. Tippin.....	377
Apple Culture, Some Requisites of Successful—G. T. Powell.....	361
Apple Growing in Europe—H. von Schrenk.....	265
Apple Habit, The.....	379
Apple Insects—J. M. Stedman.....	223
Apple Tree, How to Start the—Jacob Faith.....	120
Apple Trees Close Together, Crowding.....	370
Apple Trees, Renovating Old—Prof. L. R. Taft.....	373
Apples, Growing New.....	196
Apples, Keeping Qualities of.....	387
Apples Profitable for North Mo.—J. A. Durkes.....	186
Apples, Summer	194
Apples, Varieties of—G. P. Turner.....	183
Apples, Varieties of, for South Mo.—L. B. Woodside.....	188
Apples, Variety Discussion.....	190
Apples, When to Pick.....	230
Appointment of Committees.....	42, 166
Audubon Society of Mo.—O. Widmann.....	343
Awards to Mo. Hort. Exhibit.....	272

B

Berries, The Better the Land, the Better the.....	399
Bird Law	345, 350
Birds and Agriculture—August Reese.....	349
Birds, Resolution for Protection of.....	352
Birds, Society for Protection of.....	343
Bitter Rot in Apples—E. J. Baxter.....	207
Bitter Rot of the Apple—Prof. H. von Schrenk.....	87, 204
Bitter Rot or Ripe Rot of Apples—Prof J. T. Stinson.....	283

	Page
Blackberries as a Money Crop—J. H. Marion.....	50
Blackberry and Dewberry—M. L. Bonham.....	49
Blackberry—Discussion	52
Blackberry—Varieties	53
Black Rot in Grapes.....	297
Blue Stone Solution.....	217
Blue Vitriol and Lime.....	92
Bordeaux Mixture, Formula.....	92
Bordeaux Mixture, How to Make.....	93
Budding the Peach.....	392
Buffalo Awards	271
Bulbs, Flowering—Mrs. T. Lee Adams.....	154
Brown or Pustular Spot.....	309

C

Canker Worm, Bands for.....	86
Canker Worm, Experience With—G. P. Turner.....	95
Canna Culture—R. G. Rau.....	237
Cedar Ball or Apple.....	28
Cherries, Discussion on.....	127
Cherries, Varieties and Planting—W. H. Skinner.....	125
Cherry Culture	69
Climbers, Hardy	334
Clover, Crimson	362
Codling Moth, Spray for.....	86, 93, 217
Cold Storage	382
Cold Storage for Fruits—W. J. Murray.....	229
Colman, Hon. N. J.....	39
Committee on Final Resolutions.....	148, 353
Committee on Fruits Reports.....	78, 289
Committees Appointed	42, 166
Committees, Standing	6
Constitution	8
Constitution for Local Society.....	8
County Reports	83, 251-259
County Societies, List of.....	11
Cow Peas	179
Cow An Adjunct in Hort.—J. L. Erwin.....	25
Crown-gall on Peach.....	307
Cultivation in Orchards.....	64, 171, 176, 205, 207, 210, 361
Culture, Thorough	353
Curculio on the Apple.....	223

D

Delegates Appointed	326
Delegates, Visiting	166
Dewberry—Discussion	54
Dewberry—Pruning	313
Dewberry, The Blackberry and the.....	40
Diseases of Peaches—Wm. B. Hoag.....	304
Distribution of Apples—W. A. Gardener.....	127
Distribution of Fruit—G. V. Fowler.....	227

	Page
Drouth—F. Wellhouse	174
Drouth and Culture—C. Aul.....	208
Drouth—Discussion	210
Drouth, Fighting the—D. A. Robnett.....	204
Drouth, Fighting, the—K. B. Wilkerson.....	205
Drouth, Growing Trees to Withstand.....	371
Drouths of '97 and 1901—J. C. Evans.....	201
Dust Spray—Discussion	102, 217-222
Dust Spray—J. J. Kiser.....	101
Dust Spraying—W. D. Maxwell.....	213

E

Election of Officers.....	280
Evergreen and Its Usefulness—F. C. Meyer.....	27
Exhibits in Horticulture at Buffalo.....	76

F

Fall Planting of Fruit Trees—A. T. Erwin.....	367
Fertilization of Apples	121
Floriculture, Individual Expression in—Mrs. G. E. Dugan.....	71
Flowering Bulbs—Mrs. T. Lee Adams.....	154
Forestry, City—L. A. Goodman.....	239
Forestry Question—Miss Emma J. Park.....	60
Forestry Work—Prof. H. C. Irish.....	70
Freeze of '99—J. C. Evans.....	201
Fruitfulness, Conditions Affecting—Prof. E. S. Goff.....	363
Fruit Industry Report—D. A. Robnett.....	201
Fruit Industry Report—W. T. Flournoy.....	200
Fruit Interests and Difficulties in Miller Co.—J. R. Helfrich.....	59
Fungus, Study of	135

G

Gano Tree	193
Garden, The Kitchen—R. A. Brown.....	162
Grapes—Jacob Rommel	57
Grape Rot	98, 222
Grape Varieties	58
Growing Strawberries—D. A. Turner.....	29
Growing the Grape Vine—Ed Kemper.....	54

H

Heading Apple Trees.....	64, 131
Horticultural Study in Germany.....	351
Horticulture—G. H. Malone.....	130
Horticulture As An Educational Factor—C. H. Dutcher.....	142

I

In Memoriam	292
Insects	85
Insect Pests—Prof. Stedman.....	223

	Page
Inspectors, Official Horticultural.....	298
Instruction in Elementary Schools—Prof. J. R. Kirk.....	336
Invitations for Meetings	82, 282

K

Kerosene Emulsion	102, 132
-------------------------	----------

L

Landscape Gardening	332
Leaf-Curl	310
Leaf Roller—Prof. Stedman	223
Legislation Against Insect Pests.....	298

M

Market for Fruits, Home.....	383
Missouri Pippin—Discussion	197, 198
Miller, Sam'l, Death of Vice-Pres.....	277
Moth Trap Lantern—J. M. Stedman.....	105, 108
Moth Trap—L. A. Goodman.....	107
Moth Trap—Miss M. E. Murtfeldt.....	109
Moth Trap, Reports Against.....	110-113
Moth Trap—S. A. Hazeltine.....	103
Mulch on Strawberry Beds.....	34

N

Nature Study in Elementary Schools.....	339
Nature Study, Teachers of—Prof. Whitten.....	139
Nelson, A., Death of Treasurer.....	277
Nursery Stock, Effects of Gas on—Prof. W. G. Johnson.....	380
Nursery Storage	234

O

Officers	5
Officers Elect	280
Orchard	201-237
Orchard, Care of—Wm. McCray.....	209
Orchard Cultivation—Discussion	171
Orchard Cultivation, Plans of—L. A. Goodman.....	210
Orchard Lands of the State—E. S. Butt.....	313
Orchard Methods—Prof. John Craig.....	373
Orchard, Model and How to Produce It—W. T. Flournoy.....	162
Orchards in Mo., The Letting and Management of—F. W. Closs..	64
Orchards on Hill-sides	212
Orchards on the Contract Plan—H. S. Wayman.....	124
Orchards, Renewing Old—J. J. Bartram.....	182
Ornamental Trees, List of—L. A. Goodman.....	250
Ornamentation of Home Grounds—Miss Ruth Jackson.....	331

P

Packages, Importance of Proper—W. A. Taylor.....	386
Packing	232
Paynes Late Keeper	191
Peach Budding	392
Peach Culture—F. W. Closs.....	66
Peach Culture—J. H. Hale.....	396
Peach—Discussion	118, 311
Peach Diseases—Wm. B. Hoag.....	304
Peaches, Commercial Value of—Prof. H. R. Price.....	391
Peaches for Exhibition	77
Peaches, Grading and Packing for Market—Prof. W. G. Johnson..	394
Peaches, How Much Cold Will Kill—Jacob Faith.....	395
Peaches in Germany—Prof. Whitten.....	310
Peaches in North Mo.—A. W. Bloomfield.....	335
Peaches in South Mo.—G. W. Hopkins.....	302
Peach Growing, Suggestions on—W. R. Wilkinson.....	113
Peach in Missouri—N. F. Murray.....	388
Peach List of Varieties.....	117, 312
Peach Pruning After a Freeze—E. Williams.....	116
Peach Scab	99
Peach Varieties	98, 117
Peaches, Varieties of—H. W. Jenkins.....	116
Pear Culture	67
Pears and Plums, Varieties of—W. L. Howard.....	327
Pears in A Garden.....	353
Picking Apples	230
Piece Root or Whole.....	370
Plowing in Orchards, Deep.....	165, 171, 177
Plum Culture	69
Plum Curculio on the Apple.....	223
Plum Growing, Successful—E. L. Mason.....	315
Plum Observations—G. E. Adams.....	129
Plum Rot	98
Plums—J. H. Karnes	319
Plums Worth Growing, Are—Sam'l Miller.....	22
Pollination	121, 193, 316
Potato Apples	294
Premiums at Buffalo	271
Preparation of the Land and Beds for Strawberries—W. H. Litson..	28
Pruning the Orchard.....	163

Q

Quince Culture	68
----------------------	----

R

Raspberries, Pruning the—J. F. Wilcox.....	45
Raspberries, Spraying—J. E. May.....	44
Raspberry—Wm. H. Strong	43
Raspberry, Cultivating and Pruning.....	46
Raspberry Varieties	47
Reciprocity Between Farmer and Fruitman.....	37

	Page
Report From Arkansas	82
Report of Committee on Final Resolutions.....	148
Report of Committee on Fruits.....	78, 289
Report of Committee on Obituary.....	79, 292
Report of Secretary L. A. Goodman.....	275
Report of Treasurer	81, 268, 270
Reports From Counties	83
Reports From Local Societies.....	251, 259
Response to Welcome Address.....	19, 153
Root Knot, An Investigation—R. J. Bagby.....	226
Root Pruning	176, 178, 237
Rosette, Peach	306
Rot, Peach	308
Russian Apples	267
Rust From Spraying	287, 294
Rust on Blackberry	53

S

Scab of Apple	86, 100, 217
Scab of Peach	309
Scion, Influence of	120, 236, 277
Seedlings, New	291
Seedlings, Selected	196, 277
Seeds, Selected	64, 120
Shrubs	334
Small Fruits	134, 397
Spraying	86, 92, 99, 101
Spraying Dust—W. D. Maxwell.....	213
Spraying, Liquid—F. H. Speakman	216
Stedman, Prof. J. M., Talk on Insects.....	85
"Stingers" Will be at Their Work—C. Hartzell.....	97
Stinging Insects	233
St. Louis Exposition.....	276, 280
Strawberries by Selection, Grading Up—R. M. Kellogg.....	397
Strawberries, Discussion on	33
Strawberries From Missouri	76
Strawberries, Growing—D. A. Turner.....	29
Strawberries, Preparation of the Land and Beds for—W. H. Litson.....	28
Strawberries—Reported Varieties—J. E. May.....	32
Strawberry Beds, Mulching	35
Strawberry Growing on the Ozarks—G. L. Sessen.....	33
Strawberry Patch	398
Strawberry Planting—F. H. Speakman.....	323
Strawberry Plants, Moisture for.....	34
Strawberry, The, Growing, Preparing and Setting the Plants—F. H. Speakman	31
Strawberry Varieties	36
Sub-soiling	180

T

Teachers of Nature Study—Prof. J. C. Whitten.....	139
Teaching the Elementary Principles of Agriculture—G. B. Lamm.....	136
Thinning—G. T. Odor	209

	Page
Thinning Fruit	275
Top-working Trees	375
Trap Lantern in the Orchard.....	103-113
Tree Planters, Hints to	364
Trees Expensive, Inferior	366
Trees, Planting	248
Trees, Protecting	247
Trees, Shade	333
Trees to Withstand Drouth, Growing.....	371
Twig Spot, of Peach.....	307

V

Varieties of Apples	183, 186, 188, 190
Varieties of Blackberry	52
Varieties of Cherry	127
Varieties of Grape	58
Varieties of Peach	118, 311
Varieties of Pear.....	261, 327
Varieties of Plum	318, 321, 328
Varieties of Raspberry	46
Varieties of Strawberry	33

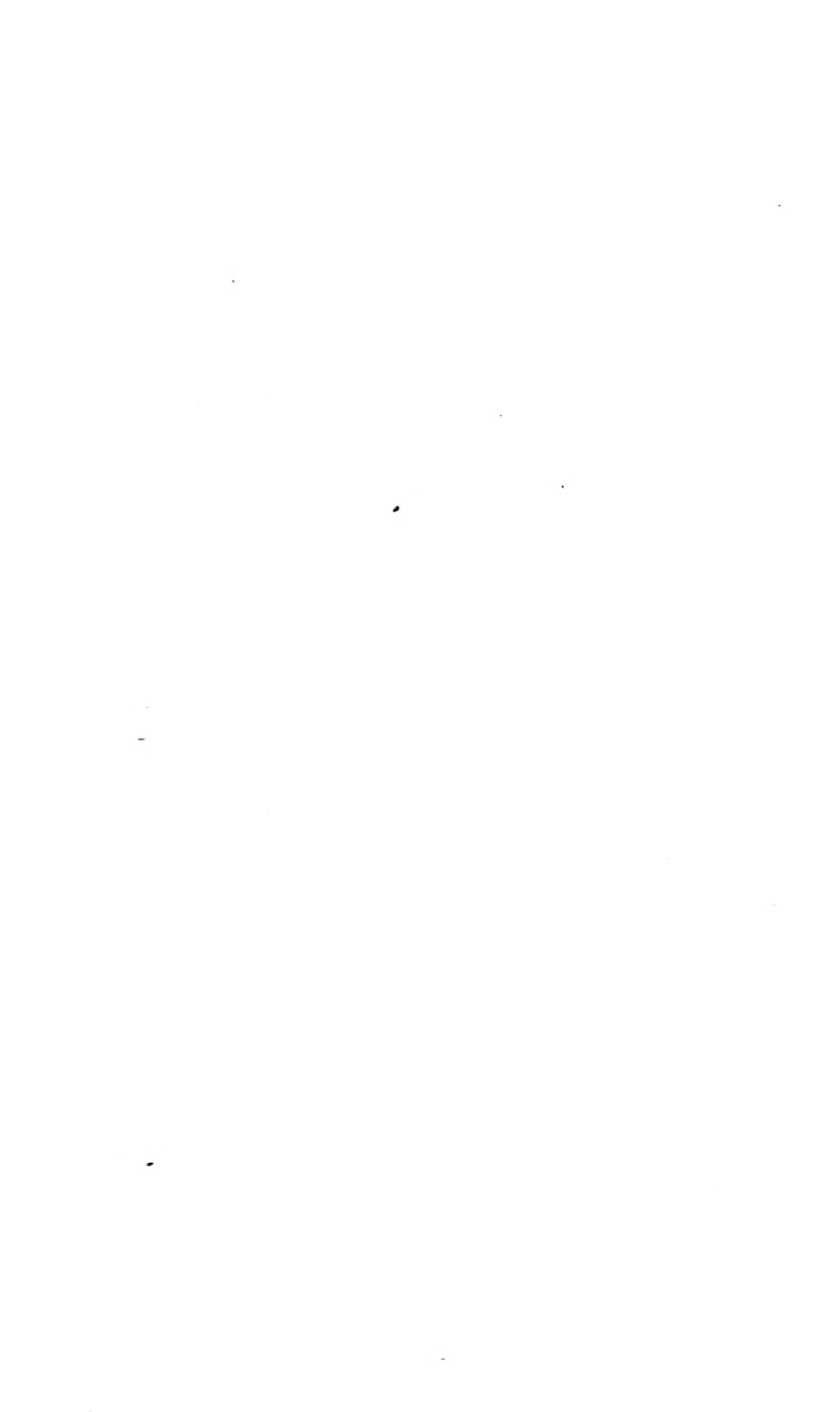
W

Wash for Apple Trees	121
Wealthy Apple	195
What I Have Accomplished on Five Acres—C. W. Halliburton....	167
Whitewash on Peach Trees.....	311
Whole Root and Piece	370
Winter Meeting	153-357
Wooden Wrappers	66, 132, 169

Y

Yellows of Peach	305
------------------------	-----







New York Botanical Garden Library



3 5185 00259 0543

